U.S.A. $2.50
CANADA $3.00

SPORTS GAMES

Antic™

The ATARI® Resource
OCTOBER 1983 VOLUME 2, NUMBER 7

- Football for the ATARI
- Atari's Computer Camps
- 'Track Star' Game
- Nightmare Mission



10
74470 12728



SHIELD 3
MISSILE
SAUCER
MISSILE
SAUCER

Have You Read The Reviews On Our New AtariWriter™?



Atari's New Word Processor.

Try it, be your own critic. Use new AtariWriter for all your family correspondence, school papers, committee reports, mailings.

Our advanced ROM-based cartridge technology means you can use it on any ATARI Home Computer (even 16K). It also lets you choose between cassette and disk storage systems.

Easy to learn and to use. "Yet," says ANALOG Magazine, "as your uses for word processing grow, (you'll employ) its more advanced features."

Menu driven, with helpful prompts. One special feature: you can correct as you write, instantly, without switching back and forth between Create and Edit modes.

You can move entire paragraphs. Search and replace. Even restore text you've just deleted, with our memory buffer.

You can change format instantly, and preview on-screen at full printer width. Print extra copies for your records.

As ANTIC Magazine concluded, new AtariWriter is "clearly superior on price and performance to Text Wizard and the ATARI Word Processor." At Atari dealers.

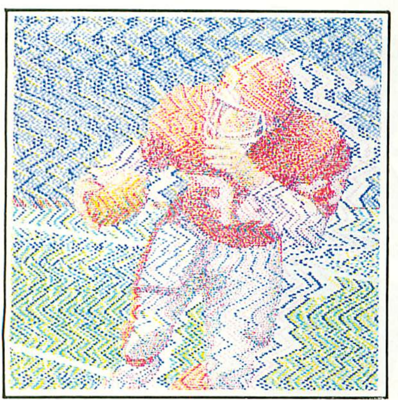
ATARIWRITER
ATARI
HOME COMPUTERS

ATARI® HOME COMPUTERS

A Warner Communications Company.

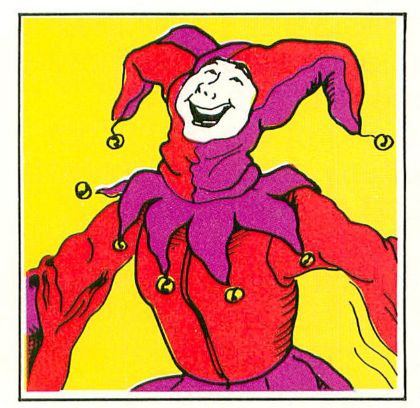


The ATARI Resource OCTOBER 1983 VOLUME 2, NUMBER 7


page 42

FEATURES

DEPARTMENTS


page 26


page 76



Arti Haroutunian has done it again.

The mind behind our first Atari® success, *Kid Grid,* has just dreamed up another one: *Juice!*

And if you don't think that's electrifying, consider what the experts are saying.

Electronic Fun with Computers and Games says that *Kid Grid* "may sound like kid stuff, but it isn't. Even on the slowest setting ...the game is quick enough to challenge almost anyone."

That's right. And that's not all.

Electronic Games calls the Kid "Hypnotic, appealing, fast-moving arcade action of the highest calibre, ...one of the most compulsive, utterly addictive contests in the world of computer gaming."

We couldn't agree more.

What will the critics say about *Juice!*? Will they like its colorful graphics, superior sound effects, charming characters and challenging play patterns?

Why wait around to find out?

ANTIC
Publishing

Editor & Publisher
James Capparell
Managing Editor
Robert DeWitt
Assistant Editor
Christopher Rauber
Technical Assistant
David Duberman
Contributing Editors
Ken Harms
Carl Evans
Steve Switzer
John Harrison
Mary Harrison
Technical Consultant
Jerry White
Art Director
Marni Tapscott
Production Artist
Kyle Bogertman
Contributing Illustrators
Lilianne Milgrom
Stuart Gold
Beatrice Benjamin
Cover Illustration
Bud Thon
Circulation Manager
Les Torok
Subscriptions
Kathryn Katz
Julianna Hoffman
Administrative Assistant
Caitlin Morgan
Advertising/Production Coordinator
Linda Tapscott
Advertising Sales
Steve Randall
(415) 221-0214

October 1983
Volume 2, Number 7
ANTIC—The ATARI Resource, is published twelve times per year by ANTIC Publishing. Editorial offices are located at 600 18th Street, San Francisco, CA 94107. Telephone is (415) 864-0886. ISSN 0745-2527. Second Class Postage paid at San Francisco, California and additional mailing offices. POSTMASTER: Send address change to **ANTIC**, 600 18th Street, San Francisco, CA 94107.

Editorial submissions should include program listing on disk or cassette, and text file on media and paper if text was prepared with a word processor. Media will be returned if self-addressed stamped mailer is supplied. **ANTIC** assumes no responsibility for unsolicited editorial material.

I/O BOARD

QUADLINK

I have recently become aware of Quadlink, a card that allows the IBM PC to run Apple software. I would think that a similar piece of hardware might be easy to make, since they both use the 6502 IC as their main processor. This would give ATARI owners access to many more programs.

Craig Beaurline
Cary, IL

Though the Apple and the ATARI use the same processor, their Operating Systems (the program that allows the computer to run other programs) are completely different. Thus, to allow the ATARI to run Apple programs, you must replace the Operating System, not a simple proposition. The Quadlink card costs more than a new ATARI 800. Of more interest may be the recently announced expansion unit for the ATARI XL machines that will accept Apple-like cards when these become available.
—ANTIC ED

RESET TO RERUN

I have written a little routine that will cause any BASIC program to restart when [SYSTEM RESET] is pressed. The effect is the same as if you had stopped the program by any normal means, then typed in RUN again. Follow these rules:

1. These lines *must* be the first three lines of the program.
2. The name of the string variable (here, RESET$) must not be used elsewhere in the program.
3. Once the program has been RUN, you cannot access the disk drive unless you reset the values of DOSINIT by doing a POKE 12,64:POKE 13,21, and then press [SYSTEM RESET] again.

```
0 DIM RESET$(60)
1 RESET$(1,49)=")□▀E□)◤ $V)□
▜T)♥)R $V)U $V)N $V)↑ $V)↑ $V)▀▀
J▟L♥█"
2 I=ADR(RESET$):H=INT(I/256):L
=I-H*256:POKE 12,L:POKE 13,H:P
OKE 842,12:GRAPHICS 0
```

To use the routine, type it in and LIST to disk or cassette. Then LOAD a BASIC program and check to see that it doesn't use lines 0-2. If it does, renumber those lines. Then ENTER the LISTed routine. After you RUN the program for the first time, pressing [RESET] will automatically RUN it again.

To disable the [BREAK] key, include the commands POKE 16,64:POKE 53774,64 after every GRAPHICS command. To even further protect your program, create a RUN-only file by adding the following line:

```
32767 POKE PEEK(138)+256*PEEK
      (139)+2,0:SAVE "D:filename.
      ext":NEW
```

For cassette, change "D:filename.ext" to "C:". Making *sure* that you have another version of the program saved somewhere else, type GOTO 32767. The file that results can only be executed with RUN. It can be LOADed, but not LISTed. Even you will no longer be able to see the listing.

Robert Glover
Jensen Beach, FL

ANTICIPATION

Eric Verheiden's "Autoboot for BASIC" (ANTIC, June 1983) stimulates me to ask if the same can be done for assembly language programs.

Richard Dawes
Huntsville, AL

See "Binary Autoload," by Ed and Jeff Schneider in ANTIC, Sept. 1983, if you haven't discovered it yet. —ANTIC ED

ANNOYING DEATH

I have an ATARI 800 and play Choplifter (Broderbund) a lot. It's annoying to have to be "killed" three times to start a new game. I experimented with the keyboard and discovered that if you press [BREAK] and then [OPTION], it will restart the game.

Brian Short
Hamilton, Kansas

continued on page 10


MOSAIC™
64K RAM
SELECT™
The only compatible 64K RAM for
ATARI® 400 and 800
Now Atari† owners can go where no Atari owner has ever gone before. With the Mosaic 64K RAM Select* you enter the world of more powerful computing with almost limitless applications!
Atari 400 owners have 64K RAM at their disposal, with 48K RAM hard-wired and four banks of 4K RAM. Atari 800 owners can expand up to 192K RAM! All with complete compatibility with Atari peripherals and software.
The owner of a 64K Select will make better use of more powerful peripherals and software. Machine language programs such as Visicalc or word processing have more workspace, up to 30%.
Programming techniques difficult, time consuming or even impossible are now practical. Such as loading DOS utilities once, page flipping, chained programs, player missile data, and/or wedges, etc. etc. etc...
You'll have access to a membership in the Select Members Club to keep you updated of all the new applications! Of course, the Mosaic 64K Select is easy to install and use. No soldering and complete picture guided instructions included.
The Mosaic 64K RAM Select, the most advanced memory system available for the Atari 400/800 computers. Serious Atari owners won't settle for less.
64K RAM SELECT FEATURES
1. Unlimited software applications.
10. No solder installation.
11. Powerful, most memory available.
100. No chip sockets for better reliability.
101. Versatile — multiple memory configurations.
110. Compatible with 8K and 16K ROM cartridges.
111. Low power design. Less power and heat than Atari 16K RAM.
1000. Can emulate Atari 1200 Memory, 1200 software.
1001. Test cycled 24 hours to insure reliability.
1010. Larger work space for disc software (i.e., Visicalc, Word Processor, etc.)
1011. Four year warranty.
1100. Allows 400 owners to run disc drives more effectively.
1101. Very low cost per byte.
1110. Allows more powerful graphic manipulations.
1111. Complete users guide.
10000. Membership in the "Select" club.
10001. Powerful program library.
10010. Disc emulation software available for super fast loads and saves.
10011. Tool kit software available — never type DOS again (format, directory and much more).
10100. All Mosaic 64K software maintains 48K RAM for program space.
10101. Allows for up to 192K RAM in Atari 800.
10110. Can be used with Atari 16K's and Mosaic 32K's.
10111. Gold edge connectors.
11000. String arrays.
11001. Allows 3-dimensional data arrays.
CALL NOW FOR MORE INFORMATION AND YOUR NEAREST MOSAIC DEALER.
1-800-547-2807.
MOSAIC™ ELECTRONICS, INC.
P.O. BOX 708
OREGON CITY, OR 97045
*Trademark of MOSAIC ELECTRONICS, INC.
†Atari is a registered trademark of Atari, Inc.
Mosaic is not affiliated with Atari.
MOSAIC 64K RAM SELECT
MOSAIC 32K ATARI
MOSAIC EXPANDER

DRAGONSMOKE MYSTERIES

Since purchasing my ATARI 800, I look forward to Dragonsmoke every month. I see, in reviewing those programs, the statements PRINT #6 and PRINT CHR$(125). What do they mean and do?

Larry Herrman
Rosell, NJ

PRINT CHR$(125) clears the screen. PRINT #6 is used to print large-sized characters to the screen in Graphics Modes 1 and 2, which are text modes. The #6 refers to Input/Output Channel 6. If a program uses none of the special screen graphics statements, Channel 6 can be used for other things. Thank you for the kind words about Dragonsmoke. —ANTIC ED

PRIZE WINNING THANKS

I just wanted to let you know that I have received my Cover Art Contest prize. Thank you for selecting my entry. The real prize, for me, was seeing my entry published in your magazine.

Cecelia Gaxiola
San Jose, CA

We would like to thank Atari Program Exchange, Broderbund Software, Data-Soft, Educational Software and Synapse Software for making available software prizes for our Cover Art Contest winners. —ANTIC ED

ANIMATED FAN WITH ANIMATION PROGRAM

I have been a loyal reader from ANTIC #1. Your magazine has since gotten bigger and better. One noticeable improvement is Steve Switzer's ATARI CLINIC. It is, by far, the most helpful new article in any magazine.

Here's a little program I hope you enjoy!

```
10 DIM S$(2000):OPEN #1,4,0,"K:"
20 GET #1,C:? CHR$(C);
30 S$(LEN(S$) + 1) = CHR$(C)
40 GOTO 20
```

This program will let you type anything you want and move it around, using the control keys, shift insert, and shift delete keys to make animation. When finished, break the program, and type PRINT S$ to see your animation sequence. The way this program works is that it gets a character from the keyboard (without return), and tacks it on to the end of S$. The animation comes in when you use the edit keys to move the text around, that is also put in S$.

Afshin Mokhtari
Hillsborough, CA

BURP

Real Computers do eat Quiche and love it (also, pizza and beer). We, at HuRee Technologies, are pleased to announce that a Nutrition Analysis Program, by our company, is targeted for marketing in the third quarter of 1983. Anyone interested in this program can write to us at P.O. Box 3611, Santa Clara, CA 95055.

D. Hunt
Santa Clara, CA

Real computers had better watch their figures. —ANTIC ED

STALKING THE WILD DISK DRIVE

We are in the market for disk drives and a printer for our ATARI 800. Are you going to compare the various types of drives in a future issue?

Ann Clark
Corry, PA

We will review the new disk drives as soon as possible. The printers will be evaluated early next year.
—ANTIC ED

UNSAVORY CHARACTERS

First, the good news. I find ANTIC to be a very helpful, first-rate publication. There have been far too many worthwhile features and articles to list here, so I'll just offer thanks to your staff and contributors.

The bad news? Your new program listings, while generally quite good, are at times quite awful. Without mono-spaced characters it is very difficult to tell how many spaces are being indicated. If a listed line breaks in the middle of a string of spaces, and the lines are not of equal length, by what mysterious process does one divine the number of spaces indicated?

Indicating control characters this way, i.e. "[T]" "ESC[CLEAR]", is also more sensible. Having control characters appear in the listing as they do on the screen is a neat trick, but serves no useful purpose unless you've memorized which key produces which character. I haven't, and I don't plan to. Nice try, but no cigar.

Sidney Schwartz
Port Jefferson Station, NY

We acknowledge the criticism and are moving on several fronts to improve the situation. We are attempting to monospace our custom font, and looking at alternative ways of printing high-quality listings. —ANTIC ED

ROOT OF THE MATTER

I'm responding to Darron Bacall's letter in June I/O Board. An easy way to find any root of any number is: ? X ^ (1/Y). X is the number and Y is the root. It won't yield exact results, but it's easier than a ten-line program.

Alan McMindes
Oklahoma City, OK

Same solution also submitted by Rhett Anderson of Canton, OH. —ANTIC ED

SEARCHING FOR SCROLLING

Your magazine has helped me learn about display lists and Player/Missile graphics, and now I am ready to learn about scrolling. Do you know where I could find an article on the subject?

Scott Sheck
Gaithersburg, MD

Expect to see a tutorial on scrolling early in 1984. —ANTIC ED

The Best is Better!

for Atari Computers

"The Graphics *Magician* makes programs like *Thunderbombs* a breeze."
—Mr. C. Loud



"Put some bounce in your animation with *The Graphics Magician.*"
—Bouncing Barney Kamunga

"Great graphics like *Transylvania's* would have been pretty hairy without *The Graphics Magician.*"—Mr. W.R. Wolf

"PIE MAN's graphics and animation were as easy as pie with *The Graphics Magician.*"—Mr. A. Prentiss

"Methinks wondrous graphics such as *Coveted Mirror's* are best accomplished with *The Graphics Magician.*"—Sir Pinguine

"It's a graphics jungle out there! Thank goodness for *The Graphics Magician* to make great games like *Expedition Amazon.*"—Mr. R. Kyologist.

The Graphics Magician

"*The Quest's* razor-sharp graphics are a cut above others thanks to *The Graphics Magician.*"—Gorn

"*The Graphics Magician* is just the ticket for arresting graphics like *Crime Wave's.*"—Sgt. R. Rammer.

"The secret's out: *Graphics Magician* is the key to the exciting graphics in *Spy's Demise.*"
—Agent 0019.95

The best tool for creating animation and pictures for your own programs is now even better. The brand new, updated version is now easier to use, and features more comprehensive editing features, the ability to mix text and graphics anywhere on the screen, and even faster, smoother animation than before. The new *Graphics Magician* comes boxed with an all-new manual chock full of examples and sample program listings. To receive the updated version, current owners should return their master disk and manual along with $15 to Penguin Software, and we'll rush the new package to you.

For other testimonials, look for products from Sierra On-Line, Sir-Tech, Mattel Electronics, Datamost, Adventure International, Sentient Software, Software Productions, Scholastic, and others that use *The Graphics Magician.*



(312) 232-1984, 830 4th Avenue, Geneva, IL 60134 Dealer Hotline: (800) 323-0116, retailers only, please.

Available at your local computer store. Dealer and distributor inquiries welcome. Visa/MasterCard accepted.

HELP!



KEYSTROKE ARTIST

We've had quite a few calls on Keystroke Artist (ANTIC, Aug. 1983). The program does run as published, but it's a bit difficult to type in. When typing the string assignments in lines 4000 to 4070, use the chart on page 104 of the same issue for guidance on graphics characters.

Lines 4000 and 4030 contain 120 characters each and 4020 contains 122 characters. To enter these lines, you must first execute a POKE 82,0 command in Immediate Mode (without a line number) to allow sufficient space. Omit the space between the line number and the beginning of the line, and in 4020, omit the final quote mark.

Also, some of the characters in lines 4000 to 4070 are ambiguous. The twenty-first character in the second line of line 4000 is an inverse lower case L. The fourth character in the second line of line 4030, also appearing subsequently in the listing, is an inverse underline character ([SHIFT] [—]). The ninth character in the same line is an inverse blank, as is the 14th character in the string CAL$ in line 4060. The eighteenth character in the second line of 4030 is a blank, as is the next to the last character of the string MIRROR$ in line 4040.

In line 1060, the inverse message should read "CHANGE COLOR TO" followed by a semicolon and a colon.

Cassette users may have problems loading a saved picture file. If you have this problem, change the number 128 in lines 1160 and 1690 to a 0 before saving a picture. Files will take twice as much tape, but loads will be more reliable.

VERTICAL MISSILES

The article "Up and Down — Vertical Movement for Player/Missiles" is excellent. However, nowhere does the article mention how to load data for missiles. Please help!

John Cabigas
San Jose, CA

All four missiles are set by the program to be two bits wide by one bit high when enabled. Unfortunately, this cannot be altered. —ANTIC ED

TALK IS CHEAP

There is an error in Figure 2: Diagram of voice-input circuit (ANTIC, p. 65, July 1983). The bottommost connection in the diagram should be labeled POT A (PIN 9), not GROUND (PIN 9).

DISAPPEARING ACT

In your June 1983 issue of ANTIC, was an article entitled "Dancin' Man." I have been dabbling in animation and I had not found an effective method of erasing a character after it was drawn. From reading your article I discovered — ? CHR$(125), a milestone in my computer education. I now see the light!

Mike Drinks
Baltimore, MD

DISPLAY INTERRUPTS

Having read the article "Start Interrupting" (ANTIC, June 1983), I wrote a display list interrupt to turn the background color to black at the bottom of the screen in one of my programs. However, whenever the program performs input or output to the disk or printer, the whole screen goes black. Can this be corrected?

Don Etherington
Redlands, CA

Your display list interrupt works by writing a new color (black) directly to the screen background hardware register after the twenty-first mode line. When the last mode line is drawn, a stage two VBI (vertical blank interrupt) occurs which updates the hardware register from the shadow register, which contains the color blue.

Disk and printer I/O are time-critical routines; during these, stage two VBI routines are not performed. That is why the screen stays black — the hardware register is not being updated. As soon as time-critical I/O is finished, the screen returns to its proper colors.

—ANTIC ED



THE CARLSTON TRIO

Brotherhood at Broderbund

by DAVID BARRY

Broderbund Software, responsible for such popular computer games as **Choplifter, Alien Rain** and **David's Midnight Magic**, was started in Eugene, Oregon, in 1980 by two brothers — Doug and Gary Carlston. They started on the strength of a series of strategy games, called **Galactic Saga**, written by Doug on his TRS-80. Doug was a practicing lawyer (Harvard Law School, 1975), but gradually the potential of the software business weaned him from legal work completely.

Brother Gary, also a Harvard graduate (B.A. in Scandinavian literature, 1973), was shuttling back and forth to Sweden, where he coached a women's basketball team that won the Swedish national championship. He also taught Swedish at the University of Washington in Seattle.

By 1979 Doug had sold a few programs to Scott Adams at Adventure International and to TSE Softside. This minor success encouraged him to enlist brother Gary's efforts in a software company.

Broderbund is now located in San Rafael, California, "closer to the action," and has grown from five to 60 people. The brothers have been joined by sister Cathy, formerly a buyer for Lord and Taylor's in New York. The trio is represented in the company logo, three crowns, which is also the Swedish national emblem.

David Barry is a technical writer in the computer field, and author of an upcoming book on the word-processing program Wordstar.



Doug Carlston Cathy Carlston Gary Carlston

ANTIC: The first games you wrote were for the TRS-80, but soon you began focusing on the Apple market? What happened?

DOUG: Software for the TRS-80 turned out to be a terrible market because most of the distribution networks were closed, even though there were plenty of machines out there. In March, 1980, we were able to get a booth at the Fifth West Coast Computer Fair. At the show, Gary and I met some Japanese traders and they had some very good Apple programs. We pursued them and also put a letter in a Japanese magazine asking Japanese programmers to write to us. A trader came back in June with programs and we started buying them from him. We got a good entertainment line going

continued on next page

for the Apple which was mostly from Japan.

ANTIC: What were the names of some of those earlier games from Japan? What was the first big hit?

GARY: The first was **Alien Rain**. That hit the market in December, 1980. Two others were **Hyper Head-On** and **Galaxy Wars**, but they weren't very successful. They had to be played sideways on American T.V.'s.

ANTIC: And each of these games was written for the Apple?

GARY: Yes. One interesting note for ANTIC's readers was the friendly pressure we kept receiving from the A.C.E. newsletter to get into the Atari market, which we resisted for a long time because we didn't have any programmers for the ATARI.

ANTIC: Why couldn't the people who were doing the programming for the Apple also program for the ATARI?

DOUG: They were all in Japan. They'd never even seen an ATARI. Furthermore they didn't have any interest in it. We didn't get our first ATARI program out of Japan until six months ago. **A.E.** was the first one the Japanese had ever done on the ATARI.

ANTIC: So you're still in close contact with Japan.

CATHY: In fact we're going to have to interrupt this interview any minute now because we're expecting a bus load of eleven Japanese.

ANTIC: Eleven Japanese programmers? What will they be doing here?

CATHY: Six of them are programmers, the others are friends. They're going to be here for a month and they're here to learn. They don't know enough about the ATARI yet, so they're going to learn all the techniques and utilities we have here and take them back to Japan.

ANTIC: Are they working for Broderbund in Japan?

GARY: Their company is called Programmer's 3 and we have been partners for three and a half years.

DOUG: We do all the marketing and distribution and a lot of the editing on the programs. We try to give them a sense of what Americans do and don't like, etc. We communciate a lot. We have a full-time Japanese translator on our staff and we try to see them a few times a year. In between we send stuff back and forth.

ANTIC: Cathy, what has been your role with the company?

CATHY: Originally I came to take charge of the office management, bookkeeping, administration, that sort of thing. After a while I noticed that our advertising was getting a little stale. We kept running the same ads all the time. I pointed this out, and was quickly appointed to do something about it. Since then I've been overseeing advertising, too.

ANTIC: How many programmers are working for Broderbund now and what machines are they mostly writing on?

DOUG: We now have sixty people working for us, twelve of them programmers, many doing conversions. Apple is still the most popular, Atari is second in terms of submissions. Those two have the largest base of young programming talent.

ANTIC: Have you found there's been difficulty in making the transition from the Apple to the ATARI in that the ATARI has greater visual capability, graphics, sound, etc.?

GARY: It's been a learning experience finding out what ATARI owners appreciate about their own machines that we were not aware of initially. The importance of sound, for example . . .

DOUG: There are real trade-offs both ways. The trouble is that people tend to have such a strong loyalty to their machine, whatever it may be, that they go out of their way to differentiate it from other machines. They pick up on particular features and make them important because they're different from what other machines have. So that's a problem. There are no real obstacles in terms of resolution, detail or any of that in making a transfer, although it was a learning experience for everybody. The main difference is getting a higher level of sound for the ATARI and Commodore.

ANTIC: For which machines are you currently programming?

DOUG: Commodore Vic, Commodore 64, Apple, IBM, ATARI, including the 5200 and the 2600 as well as the computers. The 5200 is a pretty decent machine. It's got the same capabilities internally as the computers, so it's not a bad one. We're also looking at Coleco and doing some licensing for the T.I.

ANTIC: I'm interested in the creation of a computer game, the process whereby a programmer goes from the idea for a game to the actual reality of a Choplifter rescuing hostages or a slithery creature gobbling another slithery creature. How does that come about?

GARY: I believe the germ of an idea is actually a particular routine that a programmer may come up with, say a routine that kind of gives the effect of sliding over ice. From that little routine he can build and make it into something larger.

ANTIC: Somewhat similar to the germ of an idea for a short story or a painting.

DOUG: It'd be like you were going to paint the Mona Lisa and the first thing you did was paint the smile.

GARY: Or maybe its more akin to songwriting, which is something many programmers also do. You get a little ditty, a little phrase, and you build on it until you create a game. And all we do here is try to help them build on those phrases.

ANTIC: So you give them a supporting environment here in which they can work?

GARY: Yes. We now have internally here, editors, storyboard people, animators. A programmer will come in and say, "I've got a neat routine, kind of gives an effect of sliding over ice. What can I do with it?" So everybody gets together and the animator works on little characters, the story guy works on story line and the editors come in and try to contribute towards character development and the theme. Together they come up with a complete game.

CATHY: It's much more of a group effort than it was a year ago.

GARY: And this is why programmers who work for us freelance come in on a regular basis, like the authors of **Choplifter** and **Serpentine**. At least once a week they'll come in with their current projects and if they need help getting a

continued on next page

character designed or a story idea together they can talk over different ideas, or work with the animator or editor.
DOUG: Another thing we do is create a portfolio of ideas so that if a talented person were to come to us and show us a lot of neat routines and say, "look, I can program but I don't know what to program" we can say, "here's a game idea that seems to suit your style." What we're trying to do is to offer a complete service to programmers. This is really the first year we've put so much into product development in-house.

At this point in the interview the eleven Japanese arrived and Cathy Carlston left to greet them. The interview continued with Gary and Doug.

ANTIC: What advice would you give to a young programmer struggling out there in the hinterlands?
GARY: To be prepared for almost total commitment. Because you're competing against professional people now who have, somehow or other, arranged their lives to work full time at programming. And try to work with a publisher who will work with you and is not just a broker.
ANTIC: How to you compensate programmers?
DOUG: Most of them work on a royalty basis with the royalty ranging anywhere from 15% to 30% depending on market conditions.
ANTIC: So a fellow like David Snider, who wrote David's Midnight Magic, how much did he make on that?
DOUG: Somewhere in six figures, I can tell you that much, which is not unusual for some of our top programmers.
ANTIC: And how did he come to be connected with Broderbund?
GARY: He had seen **Rasterblaster** (by Bill Budge) and was working on the Apple at college and said, "I wonder if I could do something like that?" so he started programming pinball. We were at a computer fair in Chicago and he came by with it. We saw it in its early stages and thought it was great. We bought him some equipment so that he could work faster, and then his parents fed him for the next four or five months. Between the bunch of us we got the product out.
ANTIC: What kind of game has been done to death?
GARY: Well I think software's going to resemble movies more than games. Not to say that there won't be shooting in the game, but there's going to be a whole story, plot, theme. And it's not just going to be in the documentation — it's going to be in the game. You're going to have the option to live it all out. You may still just shoot and be shot at, but its going to be within a much more freewheeling framework.
ANTIC: And is Broderbund preparing for that, trying to devise more intricate kinds of games . . .
GARY: Yes, sometimes a piece of entertainment software may take a year and a half to write. There's some pretty complicated stuff being written, with a lot of people involved, and there are a few where we'll never even recoup our investment.
ANTIC: You mean there are a few programmers that you support, while they're working on a game and at some point you just say, "forget it, it's not worth it anymore?"
GARY: Well, no, no, but they may be writing for a machine that's dead by the time the program comes out. I don't know which machine that could be, but it could happen. The fellow who wrote **Choplifter**, he's been working on his next game for 13 months now.
ANTIC: How do you compensate programmers who spend a year and a half writing a program.?
DOUG: That's why a lot of the programmers who work for us are here in-house. We're funding some people quite extensively and that's why I say we may not get our money back. We had to write off quite a bit last year. You take your chances, and as our batting average goes down, which I'm sure it must (can't be lucky forever), we've just got to build that into our cost of doing business.
ANTIC: I know you've lived in Sweden quite a few years, and have actually taught Swedish at the University of Washington in Seattle. Is Broderbund a Swedish name? How did you come up with the name Broderbund?
GARY: It's actually closest to the German and in German the word broderbund means "brotherhood".

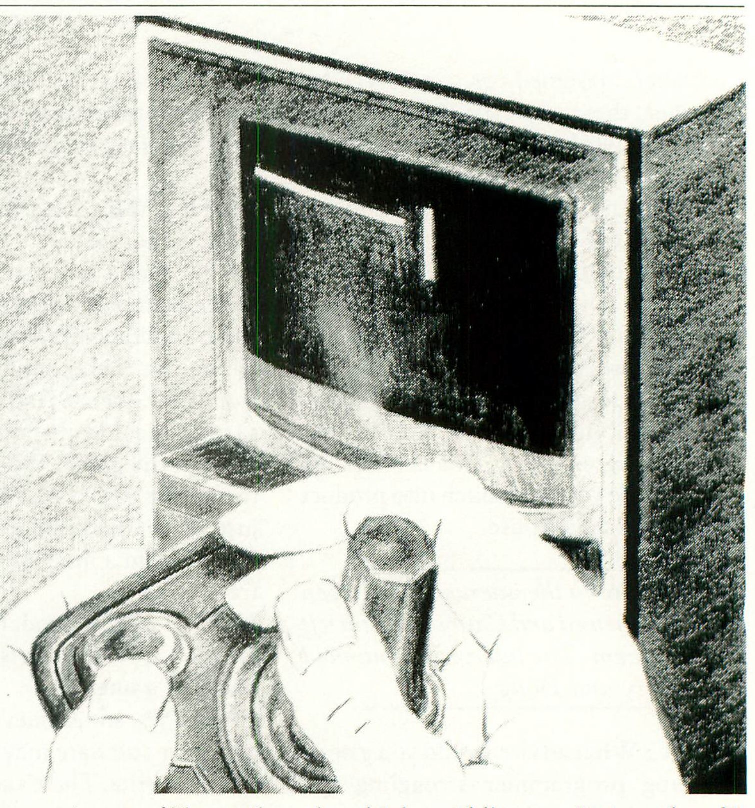
The interview continued at lunch with the eleven Japanese.

ANTIC: In what direction does Broderbund plan to move in the coming years?
DOUG: Our intention is to move in multiple lines, in three directions. One line will be the Bank Street line which is the home utility line. We plan to come out with a Bank Street Speller, Bank Street Filer, etc., programs for the family. Our second line is something we're working on with the Hensen people who were the ones who created the Muppets. It's called the computer literacy line and will concentrate on teaching everything there is to know about a computer.
ANTIC: Will it be mostly written material or software also?
DOUG: It'll be a combination of software and written material. We plan it to overview everything on computers yet remain focused each step of the way. The first series should be coming out about next summer. And the third line is what we call "Edutainment," entertainment products with educational value. Our new product **Matchboxes** is that kind of game.
ANTIC: What is it about running Broderbund that gives you the greatest satisfaction?
DOUG: I would say the greatest satisfaction is the creation of a new product, a new game just entering the market, even though I'm not immediately involved anymore in product development. Most of my time these days is spent on administrative work. Still, I would say that a new product on the market gives me the greatest satisfaction.
ANTIC: Does the future of the software field look good for Broderbund? Are you feeling burned out from computing?
DOUG: Not at all. I expect Broderbund to be somewhere in this field 10 years from now, one way or another. I still intend to be running this business.

TIME YOUR FIRE

Reflex action for beginners

by DAVID FAUGHN
Requires 16K RAM



Every ATARI knows how to tell time, at least it keeps time while it's running, and you can use this timer in your programs. An internal clock is necessary for the ATARI to do things in the proper order, and one of the most important of these chores is the regulation of the video screen.

The screen is redrawn sixty times a second. Within that small interval the computer directs the video beam to race back and forth across the screen, from upper left to bottom right, then leap to the upper left for another pass. This leap, called the *vertical blank*, is generated each 1/60 of a second by a crystal-controlled pulse that also drives the *real-time clock*.

Just as a wrist watch keeps time inside and shows the time outside, the "face" of the real-time clock reflects the time gone by. This face is in RAM memory at locations 18, 19, and 20; and you can PEEK at these to check the time.

Type in this short BASIC program:

```
10  A=PEEK(18)
20  B=PEEK(19)
30  C=PEEK(20)
40  PRINT A,B,C
RUN
```

You should see something like this:

```
0    53    196
```

The values will differ, but the first will probably be zero (unless your computer has been on for a long time). Run the program several more times. The middle number will gradually increase, but the last number may be as low as zero or as high as 255. These numbers show ATARI time at the instant you asked for it with the RUN command. The first number is sort of like an "hour hand," the middle one a "minute hand," and the last one like a "second hand," but not exactly. The ATARI doesn't keep hours, minutes, and seconds.

The minimum unit of time for the RTCLOK (as it is called) is the "jiffy," or 1/60 of a second. Memory location number 20 counts jiffies. Since each memory location holds one byte in the ATARI, and one byte can be used to count from 0 to 255 (00000000 to 11111111), location 20 starts again at 0 after the 256th jiffy. To figure the number of seconds required for location 20 to recycle, divide 256 by 60 — you will get approximately 4.27 seconds.

Every time location 20 gets full it increments location 19 by one (forgive the redundancy, increment means to increase by one, and decrement means to decrease by one). So the middle number tells how many units of 4.27 seconds have gone by — a strange way to tell time. Location 19, also being one byte, recycles after 255 increments, which is equal to 256 times 4.27 seconds, or about 18.22 minutes.

When location 19 recycles, it increments location 18, which counts periods of about 18.22 minutes (convenient correspondence, eh what?). Well, obviously we are going to tell you that location 18 counts to 255, after which the whole thing starts over like the odometer on an old car — but that takes more than three days!

It should be clear that easy arithmetic can translate from ATARI to human time. The number in location 20 counts sixtieths of a second; location 19 tallies 4.27 seconds; and location 18 represents periods of 18.22 minutes. And you can PEEK at these values even within a program.

The ATARI starts counting when you turn it on, and keeps counting until you turn it off — it doesn't stop when you look at the counters. Moreover, it doesn't care what the counters

say, so you can set them back to zero any time you want. This makes it possible to use the RTCLOK to time a game or anything else.

Trigger Finger is a simple program to demonstrate this feature. It is also an interesting test of reflexes, or possibly the responsiveness of your joystick. Let's take a look at what the program does.

Essentially, it measures the amount of time it takes you to press the fire button on your joystick a certain number of times. You can choose a number greater or less, but 50 times makes a good test. First you are asked for the number of "spaces" you want, i.e., the number of times to press the trigger. When the program runs, every time you push the trigger a one-space block appears on the screen. As soon as you reach the preset number, the program prints out the time it took you.

In the program, timing is performed in lines 80 through 200. Line 80 resets the timers to 0. At the end of the race, line 110 PEEKs memory locations 18, 19, and 20, and lines 120 through 150 convert the readings found there to a time interval. Line 125 changes jiffies to hundredths of a second. The time elapsed between resetting the registers and the end of the race is then printed out in lines 190 and 200.

The program resets itself in line 300 by RUNning itself again. The advantage of using these internal timers in a game is that they run completely independently of actions that may be occurring in your own program. If your BASIC program is busy searching through its line numbers for a GOSUB or a GOTO, the counting of these timers continues at an exact rate. The advantage of this for writing timed games, timed math drills, and other programs requiring accurate timing is obvious.

```
5 R E M T I M E F I R E   b y D a v i d   F a u g h n   f o r
ANTIC MAGAZINE
10 PRINT "HOW MANY SPACES?"
20 INPUT X
30 TI=0:M=TI+4:DRAW=X:Q=5
35 ? "PRESS TRIGGER TO BEGIN RACE."
40 IF STRIG(0)=0 THEN 60
50 GOTO 40
60 GRAPHICS 5
70 SETCOLOR 0,2,8:COLOR 1
80 FOR Z=18 TO 20:POKE Z,0:NEXT Z
90 IF STRIG(0)=0 THEN 220
100 GOTO 90
110 A=PEEK(20):B=PEEK(19):C=PEEK(18)
120 SEC=(4.267*256*C)+(B*4.267)+(A/60)
125 SEC=INT(SEC*100)/100
130 MIN=INT(SEC/60)
140 M=MIN*60
150 SEC=SEC-M
160 IF A<60 THEN 190
170 A=A-60
180 GOTO 160
190 PRINT MIN;" MINUTES ";SEC;" SECOND
S "
210 GOTO 300
220 TI=TI+1:IF TI=X THEN 110
230 GOSUB 310
240 M=M+1
250 IF M>54 THEN Q=Q+1:M=5
260 PLOT M,Q
270 GOSUB 370
280 IF STRIG(0)=1 THEN 90
290 GOTO 280
300 RUN
310 IF DRAW<51 THEN RETURN
320 DRAW=DRAW-50
330 IF DRAW<50 THEN GOTO 350
340 GOTO 310
350 PLOT DRAW+4,1:DRAWTO DRAW+4,Q+4
360 RETURN
370 PLOT DRAW+4,1:DRAWTO DRAW+4,Q+5
380 RETURN
```

TYPO TABLE

Variable checksum = 140869

Line num	range	Code	Length
5 -	100	HS	347
110	- 220	GQ	305
230	- 340	TN	217
350	- 380	DX	102

COMPUTER CAMP

Report from the Old West

by DEBORAH BURNS

On a bright and sunny day in August ANTIC paid a visit to Camp Atari — Old West, 40 miles east of San Francisco on the slopes of Mt. Diablo. Old West is just one of the seven Atari-sponsored camps held this summer, and is located on the 120-acre campus of the Athenian School near Danville, California.

Don and Marlene Applebaum, the camp's resident directors, both teach school in New Jersey, and have fifteen years experience as professional camp directors.

From June 25th to August 19 about 96 campers were admitted to each two-week session of the Atari camps. Campers pay $890 for a session and $425 for each additional week. For those who plan to stay the entire eight weeks the cost is $2,999. The other six camp sites are New England (Massachusetts), Poconos (Pennsylvania), Chesapeake (Baltimore), Smokey Mountains (North Carolina), Midwest (Minnesota), and Pacific (San Diego, California).

Last year there were just three camps, and next year Atari expects to offer three more sites for a total of ten camps. The average enrollment at the Danville camp fluctuated from 45 to 60, while the number of kids who wanted to attend the Poconos site doubled from 80 last year to 160 this year. The Applebaums attribute the difference to the fact that "summer camp" is more traditionally an east coast experience and California has more outdoor living available all year long.

"We're lucky to have an exceptional staff," said Marlene. "We've worked at many other camps with bright kids, but here all the kids are very bright. Most of the counselors are bright, too, and we need that, especially the ones who are computer and engineering students. They usually know what they're doing and what to do with the kids.

"We've had very few discipline problems. These children are above average in almost all respects," she added.

Not unlike the rest of the population involved with computers, most campers are boys. Only children ages 10 to 16 are admitted to the camp, and one out of five campers is a girl.

"We had a family group here for the first two weeks, and the sister was rather cute-sy. She did fine on computers," said Marlene, "but she showered and changed 20 times a day, too. Many of the girls are more well-rounded than that, and are involved with sports or music or other activities."

The weekday schedule for campers is packed with activity that includes a mixture of different experiences. For example, a typical daytime schedule would be as follows:

9:00-10:25 a.m.	Computer Instruction
10:30-11:10	Drama
11:15-12:00	Tennis
12:00- 1:55	Lunch — Rest Hour
2:00- 2:55	Computer Workshop
3:00- 3:35	Free Swim
4:00- 5:25	Softball

Each day varies, of course, and the evening schedule includes dinner and some planned activity or computer "free time". Other daytime activities include arts and crafts, music, aerobics, electronic workshop, hiking, soccer, volleyball, swimming, and laundry hour.

In the evenings campers can attend the movies (shown on the grounds), or take trips to town for bowling or roller skating.

Once a week on banquet night a special guest speaker, usually a computer game designer/programmer, appears to talk about his work. The week before our visit, Chris Crawford, author of Atari's **Eastern Front**, talked about his programming experience and his new games, soon to be released, called **Gossip** and **Excalibur**. The day we visited the camp, Vince Wu, designer of the famous **Donkey Kong** arcade game, was scheduled to speak.

The classrooms, of course, are the major attractions of the camp, and the campers are allowed a total of four and a half hours at the computers each day. Formal instruction and programming time is set up for two sessions per day. During "free time" in the evenings (7:00 to 8:30), at least two of the three computer rooms are open for students either to play games or practice programming.

These computer classrooms are

continued on page 22



COMPUTER CAMP
continued from page 18

equipped with $1 million of equipment, and there are three classrooms with 12 ATARI computer systems each. At maximum enrollment there are two students per computer. The students are divided into separate work groups according to interest and ability level.

Jim Brown, one of the instructors of computer education, issues a simple questionnaire to each new camper to determine their level of computer knowledge.

"If they already have done some programming, we ask them to briefly explain their programs to us," he said. "We also ask them what they're interested in."

Several kids have wanted to know more about Logo and Forth, which aren't offered in the instruction curriculum, but Jim directs them to the additional materials in the extensive library of software and books. Also, an on-site expert, trained at Atari, is available to help the campers work on any project they choose.

"We get kids who come here for two weeks whose parents say, 'you're going there whether you like it or not,'" he said. "But after five days or so we can usually change any bad attitude. It usually turns out to be a very successful experience for them, a very positive experience."

The campers were working on an assignment when we visited a morning class of an intermediate BASIC group. Each student had been given a programming assignment to be completed by the end of the afternoon session.

Tamara Ghandour, 10, of Piedmont, California, was writing graphics-character code in BASIC. Her program showed a street scene with a building, a pedestrian and a moving car.

She told us that her family owns an ATARI at home and that she and her younger sister use it. She seemed quite happy with the work and was confident she could complete her assignment by the end of the day.

Rick Bowers, 15, of South San Francisco, California, had no experience on computers before he came.

"My dad said it would be fun," he said, "and I really wanted to come."

He said he feels comfortable with computers now. We asked him if he wanted to become a game programmer.

"Not really," said Rick. "I plan to take over in my dad's machine shop. He works a lot of computers, so it will be useful."

Several of the campers, including Rick, told me that they use their evening "free time" with the computers almost every time the classrooms are open.

"Usually, the first week they get here they're really into games," said Marlene, the camp's director. "They want to get into all the fantastic software we have in our library. By the second week you see them change around.

"After that there will be just one class for games and two for programming," she continued.

In the second classroom we visited campers were learning Advanced BASIC and PILOT II. Dan Zimmerman, the instructor in that class, told us that they were field-testing the new Atari PILOT in disk form.

According to Dan, he's taught beginners that "essentially started from scratch. Some of them had typed in programs, but did not understand what they were typing. But now they're designing their own programs, including sound and graphics and doing quite well. But they're still suffering the same frustrations as most any programmer."

Then we visited the advanced group, those who have designed programs before, or want to use assembly language, or learn more about electronics. Jeff Cathers, who is an electrical engineering major in college and is the "expert" from Atari, supervised these advanced students. One of the campers was so far advanced that Jeff assigned him projects that might be given to a professional programmer. He gave him a spec sheet and a deadline just as a paid programmer under contract would receive.

Jeff Cathers is just one of the 19 counselors who assist Jim Brown and the Applebaums. Brown and Zimmerman are math and computer science instructors in junior high schools during the school year. They are assisted in the classrooms by five college students who major in computer science and engineering. Most counselors are between ages 19 and 21, except for the 28-year-old swimming instructor who regularly works for the Athenian School.

Karen Horowitz, 19, one of the counselors, attends the Fashion Institute of Technology, and supervises the arts and crafts activity.

Karen also showed us how some of the girls had created patterns on the ATARI and later transferred the design onto a weaving loom. Snapshots of the computer screen were taken and copied into the woven pattern.

Most of the campers seemed to be enjoying themselves, and quite a number of them have elected to extend their stay. The accomodations are less rugged than many camps; the students stay in the dormitories of the Athenian School, which house academic students during the regular school year.

When they're not dining or computing, the campers have many other activities to choose. Swimmers have an Olympic-sized pool, and an official Red Cross water-safety course is offered. A huge gym for basketball is available.

"We also had a whole group playing Dungeons and Dragons," said Marlene. "Not on the computer, but the original game. One of the counselors really knows that game and played Dungeonmaster. I think that goes along with the kind of child who comes here."

When we talked to Jim and the kids in the classrooms, we found that most of them were California residents, particularly from the San Francisco Bay Area.

"But we also have six brothers and cousins from France and Spain who are over here for the whole eight weeks," Jim said. "We have someone from Texas here now, and last session we had kids from Hong Kong and Australia."

According to the directors, several campers want to stay longer because "they're having a good time . . . and they want to finish a project they've started." Quite a few say they want to come back next year.

LONESOME PILOT

by KEN HARMS

Sitting beside a calm, blue lake in Idaho's Sawtooth mountains, I recently proved a philosophical statement by my friend, Anonymous: "A computer is a multi-purpose tool, not an all-purpose tool." Out here, the best turtle graphic program is a poor substitute for a rod, reel and a well-chosen fly. So, while the nine-inch rainbows fry, here are a few lines concerning letters to the author and short but delightful programs illustrating character graphic animation under PILOT.

ANTIC and its authors attempt to answer readers' questions either directly or through the I/O Board. Unfortunately, many letters are nearly unanswerable for reasons which may be illustrated by replying to a recent letter.

> *"In your article on Holiday Trees, you stated that you can get the big letters in the R:emark commands by placing a Control N right after the colon. I've tried this and it makes absolutely no difference in the looks of the print. What am I doing wrong?"*

Answer: I was trying to explain how to get the Epson printer to print R:emarks lines in expanded mode. A similar special character can be used with the Atari and other printers; see your printer handbook. These characters have no effect on the listing displayed on the screen. No special characters will turn on the large screen letters (Graphics Mode 2). To answer this question I assumed the writer was listing to the screen. If he had included a description of his printer, I could have answered more helpfully.

> *"Your Sounder article (Volume 1, Issue 6) included a section on special effects that has puzzled me for some time. In the bouncing-ball section, absolutely nothing happens even though I have checked and rechecked the typing. I hear the sound effects, but there is no bouncing ball. I strongly suspect lines 590 and 690, followed by 570 and 670. What should I do on these lines?"*

Ken Harms is Contributing Editor for PILOT and Logo, who programs for the sheer joy of computing. Readers interested in contributing to our coverage of either of these languages are invited to write him care of ANTIC.

Several people reported this problem, most probably a result of the way we used to list programs. The Epson printer I use (like the Atari printers) does not print most control characters. The 590 and 690 lines are good guesses for the problem. The key sequence should be a T:ype [CTRL] [.] followed by a space and a remark bracket. The period in one remark didn't print, leaving some confused. Lines 570 and 670 print blanks to erase the ball before the next line prints it again higher (or lower) on the screen. Be sure to include both the space and a remark bracket or PILOT will assume it's a null line and do nothing.

If all else fails on a graphic screen, a good rule of thumb is to clear the screen and start over. One way to do this is to insert a line with T:ype [ESC] [CTRL] [CLEAR]. If that doesn't work, try a GR:QUIT followed by a C:@B572 = 1 to turn off the cursor. In this program I'd insert the lines right after line 510, the start of the program.

> *"Also in the Sounder article, you lost me in the Jackhammer module, especially in lines 1220 to 1310, plus line 1340. The R:emarks were somewhat confusing as what came out on the screen looked like anything but a Jackhammer. I need some help interpreting these lines."*

Again, ANTIC's new listing conventions, with full display of *all* characters, has solved this for future programs. In this case, however, the reader is subtly reporting an error in the remark statement intended to clarify a set of non-printing graphic characters. For all of you struggling with this, lines 1250 through 1270 are listed as "same as 1180." Once they were. But I renumbered the program and forgot to change the remark. They should be "same as 1240." Sorry folks!

Although these debugging problems were relatively simple (if I got them right!), most problems can be really difficult to diagnose from a few sentences. It really helps if you send along a disk or cassette with a copy of non-functioning programs and return postage, as well as a description of the problem and your hardware configuration. Be sure to keep your original copy! I can then see exactly what the computer sees and try to fix it.

continued on next page

And a final comment from our reader:

"I'm often struck by the exotic memory locations you use with pointer variables. Where do you come up with these locations and their various functions? Do you have a PILOT memory map? If you do, how do I obtain one? I'm always impressed by the way you can come up with just the right address to solve the tricky little problems. I never can, and believe me, it's frustrating.

The secret of finding just the right address to solve a tricky problem is writing articles only when the search for an address was successful. The number of programs which haven't been written because the right address just can't be located are many. For example, an address for *all* errors (we have one for I/O errors to disk) or a *simple* way to determine the length of a variable are attractive but elusive.

Although there is no good memory map for PILOT that I know of, you might find the following three resources helpful.

The BASIC Reference Manual by Atari includes many of the most useful addresses. The Memory Map by Educational Software, Inc., is the most complete O.S. map I've seen. "Mapping the ATARI," by Ian Chadwick, is the most complete I haven't seen. Since PILOT, like BASIC, works with Atari's excellent Operating System, most of the addresses work with PILOT. But don't expect locations such as variable addresses to work in a different language — these are definitely language-dependent. In a word — experiment.

The last resource is the PILOT External Specification, available free from Atari's Customer Service group. The 'External Spec.' is an internal document (not typeset, etc.) designed for the experienced programmer. It packs lots of information into its draft-form pages, but you'll need some ingenuity to put these hints into use in your applications.

Now to this month's program. Locomotive is a simple program combining character graphics and advanced sound effects to animate an old-fashioned steam locomotive. "Character graphics" describes pictures created by stringing together characters in Atari's 256 character font. The program U:ses a *STARTUP module to get initial values for variables in #M and #R which control the left margin and the row number on which locomotive will print. Later, simply increasing this number and C:omputing it into address 82 changes the left margin to move the locomotive across the screen one space at a time. That's the basic principle behind animating character graphics — print the characters, erase them, and reprint them in a different location. You could use the POS:ition command, but since the locomotive is five lines high, five P: commands would be needed, changing the margin is simpler. To eliminate erasing, each line of characters in the locomotive includes a blank at either end. This automatically erases the last character when the string is reprinted.

The program uses #R to change location 84 to set the line number on which to print the pattern. Simply changing positions 82 and 84 and printing either *TRAIN or *TRAINRIGHT moves the locomotive back and forth down the screen.

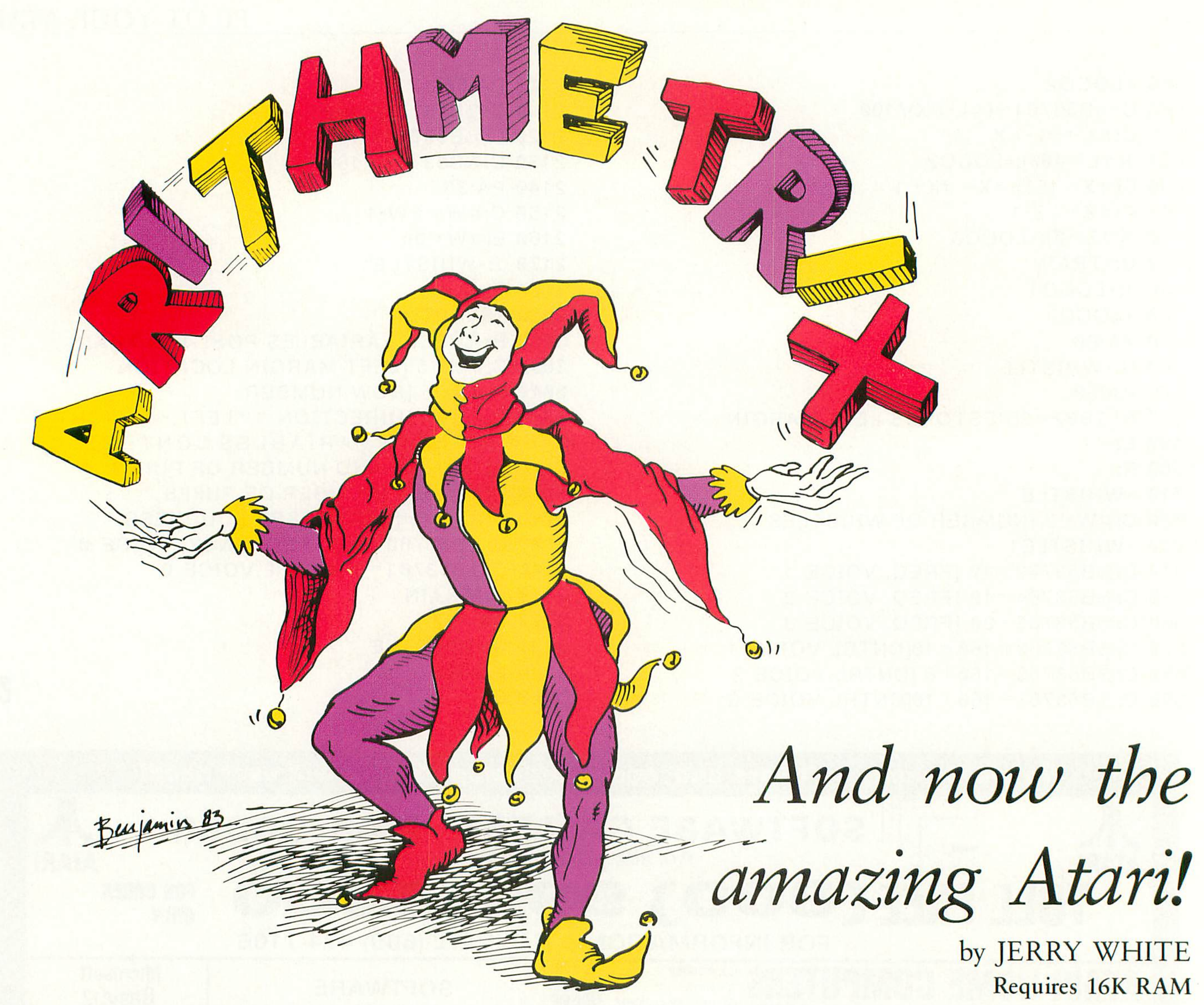
The *WHISTLE and *LOCO2 modules use special sound registers to control both a multi-voiced toot and the complex puff-puff of the locomotive. Simply, each of the four voices in PILOT is controlled by two registers — a frequency address and a control address. PILOT looks at values in the frequency register to figure out the pitch (frequency) and the control register to determine the distortion plus loudness values for each voice. See the BASIC Reference Manual or "Sounder" in ANTIC Oct.-Nov. 1982, for more information.

The *WHISTLE module sounds each of three voices at different frequencies and at distortion 160 (clear tones) but with loudness values of 8 and 10. It turns them off by setting the loudness values to 0 (lines 2110 to 2130). The same technique gives the puffs. The variable #L sets up the maximum loudness (15 times 100) and then loops *LOCO1 and *LOCO2 first sound the loud puff and then loop through to rapidly decrease the loudness. The loop proceeds slowly at first while the train is starting up and goes faster and faster as the train speeds up. This increasing speed is accomplished by increasing the "step value" (variable #X) after each puff. See lines 1060 through 1100.

Well, it's back to the campfire for these fish. Upcoming programs include a way to merge programs under program control and continuing coverage of Logo.

```
10 R:LOCOMOTIVE
20 R:ANTIC OCTOBER, 1983
30 R:
40 J:*MAINLINE
100 *TRAIN
110 C(#M=25)+(#M=4):#R=#R+1
120 C(#M=25)+(#M=4):#D=#D*-1
130 C:#M=#M+#D
140 C(#R=20):#R=0
150 C:@B82=#M
160 C:@B84=#R
170 J(#D<0):*TRAINRIGHT
180 T:         [8 BLANKS
190 T:  ●●●●  [
200 T:  ▄▄ ◥◤ [
210 T:  █████ [
220 T:  ▙●●●●◣[
230 E:
240 *TRAINRIGHT
250 T:          [9 BLANKS
260 T:   ●●●●  [REM
270 T:  ◥◤ ▄▄  [REM
280 T:   █████  [REM
290 T: ◢●●●●▟   [REM
300 R:INCLUDE BLANKS & REMARK SIGN
AFTER GRAPHIC ... THEY HOLD SPACES!
310 E:
1000 R:
1010 *MAINLINE
1020 U:*STARTUP
1030 *LOCO1
1040 C:#L=1500 [LOUDNESS VALUE
```

```
1050 *LOCO2
1060 C:@B53761=(#L-#X)/100
1070 C:#L=#L-#X
1080 J(#L>400):*LOCO2
1090 C(#X<150):#X=#X+1
1100 C:#Z=#Z-1
1110 J(#Z=0):*LOCO3
1120 U:*TRAIN
1130 J:*LOCO1
1140 *LOCO3
1150 PA:60
1160 U:*WHISTLE
1170 PA:60
1180 C:@B82=2[RESTORES LEFT MARGIN
1190 E:
2000 R:
2010 *WHISTLE
2020 C:#W=3 [NUMBER OF WHISTLES
2030 *WHISTLE1
2040 C:@B53762=40 [FREQ. VOICE 1
2050 C:@B53764=10 [FREQ. VOICE 2
2060 C:@B53766=90 [FREQ. VOICE 3
2070 C:@B53763=160+10[CNTRL VOICE 1
2080 C:@B53765=160+8 [CNTRL VOICE 2
2090 C:@B53767=160+10[CNTRL VOICE 3
2100 PA:50
2110 C:@B53763=160
2120 C:@B53765=160
2130 C:@B53767=160
2140 PA:35
2150 C:#W=#W-1
2160 E(#W=0):
2170 J:*WHISTLE1
3000 R:
3010 *STARTUP
3020 R: THESE VARIABLES POSITION TRAIN
3030 C:#M=5 [LEFT MARGIN LOCATION
3040 C:#R=5 [ROW NUMBER
3050 C:#D=1 [DIRECTION 1=LEFT,-1=RIGHT
3060 R: THESE VARIABLES CONTROL
SOUNDS      AND NUMBER OF PUFFS
3070 C:#Z=188 [NUMBER OF PUFFS
3080 C:#X=15 [DECREASES LOUDNESS
3090 C:@B53760=15[ FREQUENCY, VOICE 0
3100 C:@B53761=3 [CNTRL VOICE 0
3110 U:*TRAIN
3120 PA:120
3130 U:*WHISTLE
3140 PA:30
3150 E:
```



And now the amazing Atari!

by JERRY WHITE

Requires 16K RAM

Here is a simple ATARI BASIC program that demonstrates five arithmetic tricks. **Arithmetrix** can be used to fool your friends and make them think that your computer can read their minds.

Following is a sample run of the program, presented step by step. In each case, press [RETURN] after typing. Just read the screen, and answer the prompts as follows.

You will be asked to select a positive whole number. For all but the fourth case, use the number five for our first sample run.

(1) You are asked to multiply your number (minus one) by your number (plus one). We have chosen the number five so our number (minus one) equals four and our number (plus one) equals six. We multiply six by four and enter the result, 24. The program tells us that our original number is five.

(2) You are asked to multiply your number by three, then tell the program if the result is odd or even. Our number is five, and five times three equals 15, so type ODD. We are asked to add one to the result (16), divide by two (eight), multiply by three (24), subtract six (18), then divide by nine and disregard any remainder (two). When you enter the result of two, the program will again tell you that your original number is five.

(3) You are asked to divide your original number by three, then enter the remainder. Five divided by three is one with a remainder of two, so type two. You are then asked to divide your original number by four and enter the remainder of one, then divide by five and enter the remainder of zero. Once again, the program has enough information to figure out your original number.

(4) This time the computer will predict your result. You are asked to select a three-digit number, and make sure that the difference between the first and last digits is greater than one. For this example, we will use the number 123. The first result is obtained by reversing the order of our number (321). The second result is obtained by finding the difference between our original number and the first result (198). Result number three is obtained by reversing the digits of the second result

continued on page 28

Jerry White is Technical Consultant and regular contributor to ANTIC. His programs are available from several software companies, notably Adventure International and Educational Software.

WATCH OUT ATARI! AT-D2 HAS LANDED!

AVAILABLE NOW! WITH PRINTER PORT

. . .WITH IT'S FLEET OF THE MOST ADVANCED SINGLE AND DOUBLE DENSITY DRIVE SYSTEMS IN THE UNIVERSE - TOTALLY COMPATIBLE WITH ATARI* COMPUTER MODELS 400, 800, 600XL, 1200XL, 1400XL, AND 1450XL.

DOCK YOUR FAVORITE PRINTER DIRECTLY TO OUR DRIVE'S BUILT-IN PARALLEL PRINTER INTERFACE. THERE'S NO NEED TO BUY AN EXPENSIVE ATARI 850 MODULE.

THE COMMAND CONTROL PANEL FEATURES READ, WRITE AND DENSITY INDICATORS, A TRACK COUNTER TO LOCATE EVERY BIT OF YOUR DATA AND A TOUCH-SENSITIVE SWITCH TO PROTECT IT.

WARP SPEED OF UP TO 18 TIMES FASTER THAN **ANY** OTHER ATARI DRIVE IS ACHIEVED WITH OUR OPTIONAL TURBO-CHARGED SOFTWARE.

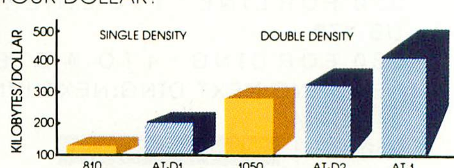
AWESOME POWER — DESTROY A PLANET OR LEARN HOW ONE IS CREATED. BALANCE YOUR CHECKBOOK OR WRITE A BESTSELLER. LEARN A NEW LANGUAGE OR CREATE ONE.

IT'S MAGNIFICENTLY SIMPLE! — JUST PLUG IT IN AND LIFT-OFF!

*Atari is a registered trademark of Atari, Inc.

TRAK'S floppy and hard disk drive systems for the Apple and IBM-PC are available at many Computerland and other fine stores worldwide.

TRAK GIVES YOU THE MOST STORAGE FOR YOUR DOLLAR!



OUR FLAGSHIP, AT-D2, WITH TWICE THE STORAGE CAPACITY OF THE ATARI 810 DRIVE PLUS A PRINTER INTERFACE AND COMMAND CONTROL PANEL, HAS A VALUE OF OVER $1000 YET COSTS LESS THAN $500!

SEE YOUR DEALER NOW FOR A TEST FLIGHT, OR

call toll free: **1-800-323-4853**
in Illinois, call collect: 1-312-968-1716
TWX 910-222-1848



ARITHMETRIX *continued from page 26*

(891). You are asked to add the second result to result number three then press [RETURN]. Like magic, your computer will tell you that the final result is 1089.

(5) In the final algorithm the computer again predicts the answer. Choose a starting number, perhaps five. To obtain the first result we multiply by six (30), add 36 (66), divide by two (33). To obtain result number two we multiply our original number by three (15). Subtract result number two from the first result, press [RETURN], and your smart little machine will tell you that your final result is 18.

The program listing is divided into sections, each labeled with REM statements. It should be obvious that there isn't any magic at all. It's all BASIC logic.

The display routine reads from DATA statements and centers each new line on the screen. Since a comma indicates a new line of DATA, the "@" character was used in the data wherever a comma is to be displayed on the screen. The display routine then searches each line and converts each "@" to ",". My thanks to Sid Hyman for the idea for Arithmetrix.

```
100 REM ARITHMETRIX by Jerry White
105 REM ANTIC MAGAZINE
110 REM Version date 5/25/83
120 REM
130 DIM LINE$(40),R$(4),C$(1):GOSUB 79
0:GOTO 270
140 REM
150 REM DISPLAY SUBROUTINE
160 REM
170 POKE 752,1:LM=INT(19-LEN(LINE$)/2)
:Y=Y+2:IF Y<24 THEN 190
180 JIFFY=120:GOSUB 760:? CHR$(125):Y=
2
190 FOR DISPLAY=1 TO LEN(LINE$):X=LM+D
ISPLAY
200 C$=LINE$(DISPLAY,DISPLAY):IF C$="@
" THEN C$=","
210 POSITION X,Y:? C$;:NEXT DISPLAY:RE
TURN
220 FOR LINE=1 TO LINES:READ LINE$:GOS
UB 170
230 FOR DING=4 TO 0 STEP -1:SOUND 0,LI
NE,2,DING:NEXT DING:NEXT LINE:RETURN
240 REM
250 REM MAIN PROGRAM
260 REM
270 Y=0:LINES=10:GOSUB 220:?:GOSUB 86
0
280 REM
290 REM FIRST ALGORITHM
300 REM
310 LINES=2:GOSUB 220:GOSUB 820
320 N=SQR(RESULT+1):GOSUB 920
330 REM
340 REM SECOND ALGORITHM
350 REM
360 LINES=2:GOSUB 220
370 POKE 752,0:?:POKE 764,255:INPUT R
$
380 IF R$(1,1)<>"O" AND R$(1,1)<>"E" T
HEN RLINE=410:GOTO 830
390 IF R$="O" THEN RESTORE 1120
400 IF R$="E" THEN RESTORE 1130
410 LINES=1:GOSUB 220
420 RESTORE 1140:LINES=3:GOSUB 220:GOS
UB 820
430 IF R$(1,1)="O" THEN N=2*RESULT+1
440 IF R$(1,1)="E" THEN N=2*RESULT+2
450 GOSUB 920
460 REM
470 REM THIRD ALGORITHM
480 REM
490 LINES=4:GOSUB 220:POKE 752,0:?
500 TRAP 830:RLINE=510:POKE 764,255:IN
PUT A
510 LINES=2:GOSUB 220:POKE 752,0:?
520 TRAP 830:RLINE=530:POKE 764,255:IN
PUT B
530 LINES=2:GOSUB 220:POKE 752,0:?
540 TRAP 830:RLINE=550:POKE 764,255:IN
PUT C
550 S=40*A+45*B+36*C:Q=S/60:Z=(Q-INT(Q
))*60:N=INT(Z+0.05)
560 TRAP 40000:GOSUB 920
570 REM
580 REM FOURTH ALGORITHM
590 REM
600 LINES=11:GOSUB 220:FINAL=1
610 INPUT R$:N=1089:? CHR$(125):?:GOS
UB 920
620 REM
630 REM FIFTH ALGORITHM
640 REM
650 LINES=6:GOSUB 220
660 POKE 764,255:INPUT R$:N=18:?:DONE
=1:GOSUB 920
670 REM
680 REM END OF PROGRAM
690 REM
700 GRAPHICS 0:POKE 764,255:?:? "BASI
C":? "IS";:END
710 REM
720 REM SUBROUTINES
730 REM
740 FOR DING=8 TO 0 STEP -2:SOUND 0,0,
2,DING:NEXT DING:RETURN
750 FOR BONG=4 TO 0 STEP -0.1:SOUND 0,
102,12,BONG:NEXT BONG:RETURN
760 POKE 540,JIFFY
770 IF PEEK(540) THEN 770
780 RETURN
790 GRAPHICS 0:C=INT(RND(0)*16)
800 SETCOLOR 2,C,2:SETCOLOR 4,C,2:SETC
OLOR 1,C,12
810 RETURN
820 ?:LINE$="ENTER THE RESULT THEN PR
ESS RETURN":GOSUB 170:GOTO 850
830 ?:LINE$="I DON'T UNDERSTAND THAT"
:GOSUB 170:GOSUB 750:IF RLINE THEN GOT
O RLINE
840 GOTO 820
```

continued on page 30



COMPUTER PALACE

Over 1000 Items For Your Atari!

ATARI

We Know ATARI Computers... Call Us For The Latest Info: (503)683-5361

Pole Position



$44.90

The reviews are coming in on this one, and it sounds like another Winner From Atari!!! Super Scrolling Screen... Fast Speedway Action! 16K Cartridge

Super Mailer PLUS

From Royal Software

new ZIP

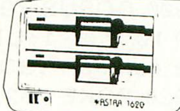
48K DISK **$49.95**

Dealer Inquiries Invited

- Store 500-2000 files per disk.
- Fast machine language sorts.
- Works on single or double density.
- Automatic delete of duplicates.
- Special coding feature.
- Official state abbreviations are built in.
- Re-label fields for unlimited uses.
- Merge files. • Create sub-files.
- Search files on any field.

FREE Catalog

With any order, or send $1 (refundable with purchase). Send us your name & address for FREE QUARTERLY FLYERS with SPECIALS!



Over 1000 items for your Atari...

- Mosaic • Percom
- Broderbund • APX
- Roklan • Datasoft
- Synapse • A.I.
- On-Line • Atari
- Hayes • Epson
- Visicalc • More!

Use Your Credit Cards!

We honor VISA, American Express, & MasterCard.

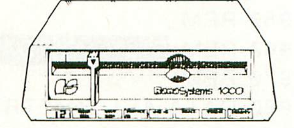
24 & 48 Hour Shipping Is Available... CALL!

ASTRA 1620 Disk Drive

$488.00 Plus Freight

Double Density x 2 Drives = 4 Atari 810's

RANA 1000 Disk Drive



Double Density **$349.00** Plus Freight

Baseball

Super Sharp Colorful and Smooth Graphics, with 2-Player Option make this a Great Entertainer.

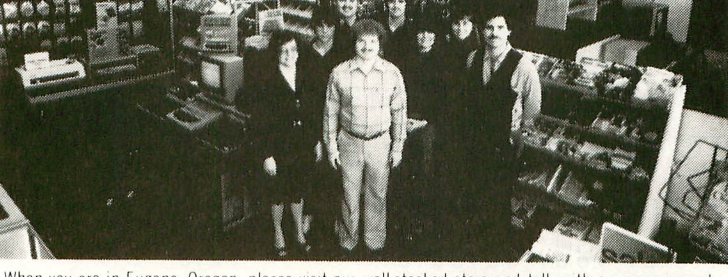
32K DISK or TAPE



From GAMESTAR **$28.90**

Welcome To Computer Palace...





When you are in Eugene, Oregon, please visit our well-stocked store and talk with our experienced, helpful Atari Experts. We have the largest selection of Atari Software & Hardware in the Northwest! **We specialize in Atari... So we know what works best!!!**

$54.00 The Monkey Wrench II

A cartridge for the right-hand Slot of your Atari 800!

This is a BASIC & Machine-language **Programmers Aid** for the 800. It plugs into the right slot, and works with Atari BASIC to add 16 new direct-mode commands(Incl. Auto line numbering, Delete lines, Renumber BASIC, Hex-Dec conv., Find string, Move lines, Exchange string, Disk directory from BASIC, Mem test, More.) Also includes a monitor with 15 commands to interact with the 6502. This has been proven to be a very helpful tool when writing your own programs!

ALL-TIME FAVORITES

Star Raiders(C)	38.20
Eastern Front (D,T)	27.90
Pacman (C)	39.50
Temple of Apshi (D,T)	35.10
Zork I, II, or III (D)	each 35.10
Centipede (C)	39.50
Missle Command (C)	29.70
Shamus (D,T)	31.50
Ghost Hunter (D)	34.95
Ghost Hunter (T)	29.95

TOP-TEN GAMES

Zaxxon (D,T)	35.10
Donkey Kong (C)	44.90
Choplifter (C)	39.50
Astro Chase (D,T)	26.90
Miner 2049er (C)	44.90
Football (D,T)	29.60
Pharaoh's Curse (D,T)	31.50
Dig Dug (C)	39.50

SUPER SPECIALS... Up To 70% Off!

	Retail	Special		Retail	Special
Gorf(D)	39.95	19.95	Ricochet(D)	29.95	9.95 Deal!
Pacific Coast Hwy(D)	29.95	15.95	Morlock's Revenge(?)	29.95	9.95 A Steal!
Protector(D,T)	34.95	19.95	Space Invaders(C)	34.95	19.95
KStar Patrol(C)	39.95	19.95	States & Capitols(T)	15.95	7.95 Wow!
KRazy Kritters(C)	39.95	19.95 Value!	Atari Mailing List(T)	24.95	9.95
KRazy Antics(C)	39.95	19.95	Serpentine(D)	29.95	12.95
Airstrike(D,T)	39.95	23.95	Apple Panic(D,T)	29.95	9.95 Low!
Baseball(C)	49.95	29.95	Stellar Shuttle(D,T)	29.95	9.95
Picnic Paranoia(D,T)	34.95	19.95	Clown's & Balloon's(T)	29.95	12.95
Dr.Goodcodes Cavern(D)	29.95	9.95 Wow!	Megalegs(T)	29.95	9.95 Look!
Match Racer(D,T)	29.95	9.95 Look!	Compumath Fractions(D)	29.95	12.95
Nautilus(D,T)	34.95	19.95	Intruder(T)	29.95	9.95 Super!
Chicken(D,T)	34.95	19.95	K-Dos(D)	59.95	19.95 A Steal!
Slime(D,T)	34.95	19.95	Alien Swarm(D)	29.95	12.95
Rear Guard(D)	29.95	9.95 Wow!	Snake Byte(D)	29.95	12.95
Tutti-Frutti(D)	29.95	9.95	Turmoil(C)	34.95	14.95

HARDWARE

Astra Disk Drive	488.00
Micromainframe Disk Drive	499.00
Atari 1020 Printer	279.00
Atari 1010 Recorder	86.00
Atari 1025 Printer	499.00
Panasonic Monitor (Grn Scrn, w/sound)	199.00
Dust Covers (400/800/410/810)	each 8.95
Prostick II Joystick	27.50

SOFTWARE

Ft. Apocalypse (D,T)	31.50
Shadow World (D,T)	31.50
Microsoft Basic II (C)	79.10
Diskey Utility (D)	44.90
Pinhead (D,T)	26.90
Jumpman (D)	35.10
Blue Max (D,T)	31.50
Odessa Chess (D)	59.50
Frogger (T)	23.95

```
850 POKE 752,0:?:TRAP 830:POKE 764,25
5:INPUT RESULT:RETURN
860 POKE 752,1:?:? "     PRESSSTART
 TO CONTINUE";:GOSUB 740
870 IF PEEK(53279)<>6 THEN 870
880 IF PEEK(53279)=6 THEN 880
890 IF DONE THEN RETURN
900 GOSUB 790:GOSUB 910:RETURN
910 Y=-1:LINE$="Select a positive whol
e number.":GOSUB 170:GOSUB 740:RETURN
920 POKE 752,1:IF FINAL THEN 940
930 ?:? "     YOUR ORIGINAL NUMBER IS
 ";N:GOSUB  860:RETURN
940 ?:? "     YOUR FINAL RESULT IS "
;N:GOSUB  860:RETURN
950 REM
960 REM DISPLAY DATA
970 REM
980 DATA ARITHMETRIX by Jerry White
990 DATA This program will demonstrate
 five
1000 DATA simple number tricks. In ea
ch case
1010 DATA you will choose a positive w
hole
1020 DATA number and write it down.
1030 DATA The program will ask you to
make
1040 DATA calculations and enter resul
ts.
1050 DATA ARITHMETRIX will then give y
ou the
1060 DATA value of your original numbe
r or
1070 DATA the results of your calculat
ions.
1080 DATA Multiply (your number+1)
1090 DATA by (your number-1).
1100 DATA Multiply your number by 3 th
en
1110 DATA tell me if the result is Odd
 or Even.
1120 DATA Add 1 to the result then div
ide by 2.
1130 DATA Divide the new result by 2@
1140 DATA multiply by 3@ subtract 6@
1150 DATA then divide by 9.
1160 DATA Disregard any remainder.
1170 DATA This time your number must b
e
1180 DATA less than 60.
1190 DATA Divide your original number
by 3 then
1200 DATA enter the remainder.
1210 DATA Divide your original number
by 4 then
1220 DATA enter the remainder.
1230 DATA Divide your original number
by 5 then
1240 DATA enter the remainder.
1250 DATA This time you must use a thr
ee digit
1260 DATA number. The difference betw
een the
1270 DATA first and last digit must be
 greater
1280 DATA than 1. Reverse the order o
f your
1290 DATA number and label it RESULT1.
1300 DATA Find the difference between
your
1310 DATA original number and RESULT1@
 and
1320 DATA label it RESULT2. Reverse t
he digits
1330 DATA of RESULT2@ and label it RES
ULT3.
1340 DATA Add RESULT2 to RESULT3
1350 DATA then press the RETURN key.
1360 DATA Multiply your number by 6 th
en add 36.
1370 DATA Divide the result by 2@ and
label it
1380 DATA RESULT1. Multiply your orig
inal
1390 DATA number by 3@ and label it RE
SULT2.
1400 DATA Subtract RESULT2 from RESULT
1
1410 DATA then press the RETURN key
```

TYPO TABLE

Variable checksum = 568331

Linenum	range	Code	Length
100-	200	KE	369
210-	320	FE	295
330-	440	GN	390
450-	560	SC	437
570-	680	JQ	262
690-	800	TP	371
810-	920	LT	488
930-	1040	IE	395
1050-	1160	HS	412
1170-	1280	DX	426
1290-	1400	RG	451
1410-	1410	VZ	31

The Atari® Plug-Compatible Printer from Axiom...

The AT-100. $299!

Made by **SEIKOSHA**, the high technology division of **SEIKO**, Axiom's new AT-100 is the only after market printer compatible with Atari 400, 800 and 1200 computers. It plugs into your Atari user/serial port and requires no 850 interface. It even comes complete with cable. Now you can perform low cost word processing and beautiful graphics; complete with a 2-year user warranty. We'll repair and ship within 48 hours or send you a new printer — free. Don't wait. Call or write Axiom today for the name of your nearest dealer.

®Atari is a registered trademark of Atari Inc., a Warner Communications company.

Eight Reasons Why You Need the AT-100

- Plugs directly into your Atari 400, 800 and 1200. Cable included. No 850 interface needed
- Allows minimum system of Atari 400, cassette and AT-100 printer
- Makes word processing simple — at a low, low cost
- HI-RES screen dump software included
- Two-year user warranty
- Other peripherals (disk drive, cassette recorder) can be daisy-chained to printer without need of 850 interface
- Uses standard width fan-fold paper
- Has a no-mess cartridge ribbon

AXIOM

AXIOM CORPORATION

1014 Griswold Avenue, San Fernando, CA 91340
(213) 365-9521 • TWX: 910-496-1746

SEE REVIEW IN JULY 1983 ISSUE OF SOFTSIDE MAGAZINE.

DOS SECTORS TO FORTH

Salvage that data

by BILL VAN HASSEL

Before I started programming in Forth, I had done a fair amount of work designing special character sets. I had also been using the VersaWriter from Versa Computing, Inc. All this work was stored away under Atari DOS format. One of my first tasks was to salvage this work for use in my Forth programs.

Atari DOS and Forth use a different scheme for numbering disk sectors. DOS begins numbering with one while Forth begins with zero. Forth also uses all 128 bytes for data, while DOS uses the last three bytes for a file number identification, character count and the number of the next sector in the chain. The 128th byte of a DOS sector (byte 127) contains the number of bytes used in the sector. This is usually 125 except in the case of a final short sector. Bytes 125 and 126 contain the file number I.D. (six bits) and the "forward sector pointer" (ten bits). The Forth words in the listings take care of these minor complications and allow you to move DOS sectors to Forth sectors easily.

The code is valFORTH 1.1, which is an extended fig-Forth. One of their diskettes contain words to load and invoke special character sets. The same diskette contains a character editor and a sound editor as well as words for Player/Missile graphics.

THE FORTH SCREENS

The words MOVEIT, NEXTSECTOR and CHAIN on screens 5 and 6 of the listing generalize the movement of DOS sectors to Forth sectors. The rest of the listing contains two application examples.

CHAIN uses MOVEIT and NEXTSECTOR to follow the DOS sector links and stores the data at PAD.

NEXTSECTOR expects the current buffer address on the stack and leaves the next sector number.

MOVEIT gets the character count from the section-link byte, moves the proper number of characters, and increments the address at DEST.

CHARACTER FONT EXAMPLE

GETFONT expects the source DOS sector number and the destination Forth screen number on the stack. The Forth screen number is multiplied by four to convert it to a BLOCK number and the DOS sector number is decremented to compensate for the difference in the way sectors are numbered in the two systems. It then uses CHAIN to read the DOS sectors. At lines 12 to 15 the data stored at PAD is moved to the BLOCK buffers, UPDATEd and FLUSHed to the disk.

VERSAWRITER EXAMPLE

VERSA@ expects the Atari Graphics Mode number and the starting DOS sector number on the stack. It then uses CHAIN to read the DOS formatted picture data. It uses the address of the display memory stored in location 88 by the ATARI OS. This address is decremented by 14 to provide space for the color information stored with the picture. This information is then used by the words GR8CLRS or GR7CLRS to set the proper colors.

BLANKSCREEN is optional, it just blanks the screen while the picture is being read in. If you want to see the picture being formed, you can omit this word. If you do omit it, your picture may not be in the correct colors until the set color words in lines 8 thru 12 are executed.

```
Scr # 5
  ( DOS TO FORTH )
  Ø VARIABLE DEST 2 ALLOT
  : MOVEIT ( ADDR. -- ADDR.)
      DUP DUP 127 + C@ DUP tROT
      DEST @ SWAP CMOVE
      DEST +! ;
  : NEXTSECTOR
    ( CURR.BLK.ADDR -- NXT.SECT)
      DUP 125 + C@ 3 AND 256 *
      SWAP 126 + C@ + 1- ;
                          -->
Scr # 6
  ( DOS TO FORTH )
  : CHAIN ( FORTH.SECTOR.# -- )
      BEGIN
          BLOCK MOVEIT
          NEXTSECTOR DUP -1 =
      UNTIL DROP ;
  : ?RETURN ." PRESS RETURN."
      BEGIN KEY 155 = UNTIL ;
                          -->
Scr # 7
  ( DOS TO FORTH .. GETFONT)
  : GETFONT
  ( DOS.SECT.# FORTH.SCREEN.# -- )
      4 * SWAP 1- PAD DEST !
      CR ." INSERT SOURCE DISK."
      ?RETURN
      CHAIN
      CR ." INSERT DEST. DISK."
      ?RETURN
```

```
   1024 0 DO 1+ DUP 1- BLOCK
   PAD I + SWAP 128 CMOVE
   UPDATE 128 +LOOP DROP
   FLUSH ;
                          -->
Scr # 8
 ( VERSAWRITER PICTURE FETCH )
 : BLANKSCREEN ( -- )
   0 0 0 SE.   1 0 0 SE.
   2 0 0 SE.   4 0 0 SE. ;
 : GR8CLRS ( ADDR. -- )
   DUP 4 + C@ 1 0 ROT SE.
   DUP 6 + C@
   SWAP 5 + C@
   2DUP 2 <ROT SE. 4 <ROT SE.
   ;
                          -->
Scr # 9
 ( VERSAWRITER PICTURE FETCH )
 : GR7CLRS ( ADDR. -- )
   DUP 4 + C@ OVER 7 + C@ 0
          <ROT SE.
   DUP 5 + C@ OVER 8 + C@ 0
          <ROT SE.
   DUP 6 + C@ OVER 9 + C@ 2
          <ROT SE.
   DUP 10 + C@ SWAP 11 + C@ 4
          <ROT SE. ;
                          -->
Scr # 10
 ( VERSAWRITER PICTURE FETCH )
 : VERSA@
  ( GR.MODE DOS.SECTOR.# -- )
   1- SWAP GR.  BLANKSCREEN
   88 @ 14 - DEST !
   CHAIN
   ( NOW GET COLORS )
   88 @ 14 - DUP 3 + C@ 30 =
   IF
      GR8CLRS
   ELSE
      GR7CLRS
   ENDIF ;
```

valFORTH 1.1

Valpar International
3801 E. 34th Street
Tucson, Arizona 85713
609-790-7141
800-528-7070
24K—Diskette
$59.95

Reviewed by Bill Van Hassel

Being a full time programmer for IBM and DEC mainframes, my home ATARI was used mainly for game playing. I had programmed some BASIC and experimented with special character sets and other graphics but didn't want to spend the time needed for Player/Missile graphics and display list formatting.

Then I bought Valpar International's implementation of Forth. Using their system, programs that I would not have attempted in BASIC have been finished in an afternoon. My first game program was unplayable until I put delay loops in to slow it down!

As a programming language, Forth is 15 to 20 times faster than BASIC and gives you control over the full capabilities of your computer. The Valpar implementation is the fig-Forth model with many ATARI-specific extensions.

The complete system comes on eight diskettes, but you can get started with valFORTH 1.1 which contains the Forth kernel, 6502 assembler and editors. In addition to these fundamentals, this first diskette also has sound and graphics, floating point, debugging aids, printer utilities and disk format and copy words.

The other seven diskettes extend your programming power to include Player/Missile graphics, character and sound editing, display list formatting and interrupts, text formatting, turtle graphics and more. Quite an impressive array!

The system core requirements will vary depending upon your choice of features. The kernel itself requires 24K RAM. My "working" system includes some sections from all but the valDOS diskettes and uses about 35K. This may sound like a lot of core, but applications link into this stored code and require little in additional core.

The documentation is good. Each diskette has its own tutorial that takes you through the material step by step. This section is followed by a glossary that describes the function of each of the words in the package. Source code listings are provided for all the extensions, and several demo programs are included to further explain the system.

I would recommend Forth and this particular implementation to anyone who really wants to control the ATARI.

NIGHTMARE MISSION

MAC's the one for the job

by DAVID and SANDY SMALL

The assignment?

Produce a high-quality game simulating the behavior of a new aircraft from a major aerospace manufacturer. The game is to be used at trade shows.

The destination equipment?

The end-user had a number of ATARI 400's with 16K RAM.

The time allowed?

Unlike the usual three to six months allowed for game development, we had four weeks.

Four weeks! To develop over 250 pages of assembly code (some 25K of object)? Yes, four weeks.

Most sane programmers would have declined the task. This is just not enough time to develop all the terrain and bitmaps, type in all the code, and get the whole works debugged. And did I mention that we had to put it all into a cartridge for the end-user?

However, other considerations made us tackle this assignment. First was our professional pride. Second was our belief in our equipment. Third, and most important, were our upcoming bills; a second baby was due to arrive any day.

So, we accepted the challenge, and delivered the game on schedule. To be sure, we cut things a little close — we delivered the game the day the trade show opened — but we made it.

How did we do it? That's the subject of this and several upcoming columns. Briefly, we used some very advanced equipment and techniques to drastically shorten the development time for the game. The individual methods will be covered in these columns, for your use.

The emphasis here is not just on getting the job done. Rather, we are speaking of getting a large programming task done very quickly. Anyone who has paid for programming services knows how expensive a programmer's time is; herein are some valuable tips to cut down the amount of time required to develop products for the ATARI. Software developers take note! The techniques used here can save you weeks of development time and large amounts of money.

The first topic we'll cover is assemblers. The program had to be written in assembly language in order to be put on cartridge. To be sure, a variety of other languages can possibly be put on cartridge, but we didn't have time to experiment with unknowns. In order to write an assembly language program, we need an assembler — and in this case, the best one available, for there would be many assemblies and thousands of lines of code. The amount of time that would be wasted by a slow assembler was unacceptable for a project that had to be done in four weeks.

We have used a variety of assemblers for the ATARI. For this project, we selected the best of the group — MAC/65. MAC/65 is from Optimized Systems Software in Sunnyvale, California.

I must admit that this was a difficult choice. We had not used MAC/65 before embarking on this project, so if it had not lived up to its advertising, we would have been in trouble. Fortunately, it did, and MAC/65 turned out to be a key factor in our making this tight deadline; it is a fast, debugged assembler and editor rolled into one. How fast? Would you believe 320K of source code assembled in under three minutes? That's about 4000 lines of code per minute, including disk-access time.

Why did we decide to go with MAC/65, a relative unknown? Let's look briefly

continued on page 36

Screen from the JVX project.



Dave and Sandy Small are professional programmers working with ATARI computers and ATARI-compatible peripherals and software to produce commercial software to run on ATARIs. They begin here to share some discoveries, insights, experiences and secrets of interest to others at or near their level of practice. Each article is intended to stand alone, but articles are sequential and full value may depend on reading the whole series. Questions or suggestions can be addressed to them care of ANTIC. Responsive answers are not guaranteed, but may be made individually by mail (if self-addressed stamped envelope is provided) or publicly in this department.

FLIP SIDE *continued from page 70*

imaginative or vindictive student from unauthorized access to or alteration of his or another student's records. Secondly, we must insure that frequent backup copies are made and archived so that a computer casualty does not eliminate an entire semester's results. Finally, we must not overwhelm the administration or teacher with computer-related tasks. Just because it is possible to keep more information and generate more reports does not mean that we should do it.

When mainframe or minicomputers were providing the bulk of computing resources to the classroom, the protection of student records was relatively simple. Often, not even the teacher had sufficient information to alter records. Each machine's operating system was designed to provide several levels of security to user and system files. As microcomputers become more widely used, the built-in security of the larger machines is often lost. The ultimate responsibility for security of student information rests with the individual school and with each teacher implementing CMI in the classroom. While more sophisticated protection schemes are being implemented, schools must develop and maintain their own security procedures.

In the area of archiving, software publishers need to cooperate with their customers. Schools will not purchase expensive software or fragile media if they are unable to make archive and record copies. Often one copy of a program is worse than none. Where separate data diskettes or tapes are used, the teacher must make it a part of daily routine to backup each class period. It only takes one loss-of-data accident to emphasize the catastrophic results of not maintaining backup copies.

In the last area, school systems that intend to computerize should be willing to train the personnel involved. Administrators need to be consulted frequently to decide which reports should be discontinued and what additional information is desired. Schools could fund workshops for its implementation and solicit suggestions for future capabilities.

Parents need to become active in the decision-making process. They can ask questions, volunteer expertise, or sit on committees that select the hardware and software to be used in the school. Most of all, they can be supportive as the new materials are implemented while demanding that high standards be maintained in the education of their children.

THE ATARI FAMILY

No microcomputer will satisfy the needs of a large school system. Even large high schools may find it easier to share administrative packages via terminals from a central mainframe or minicomputer. Small private schools and individual teachers will benefit most from using the microcomputer.

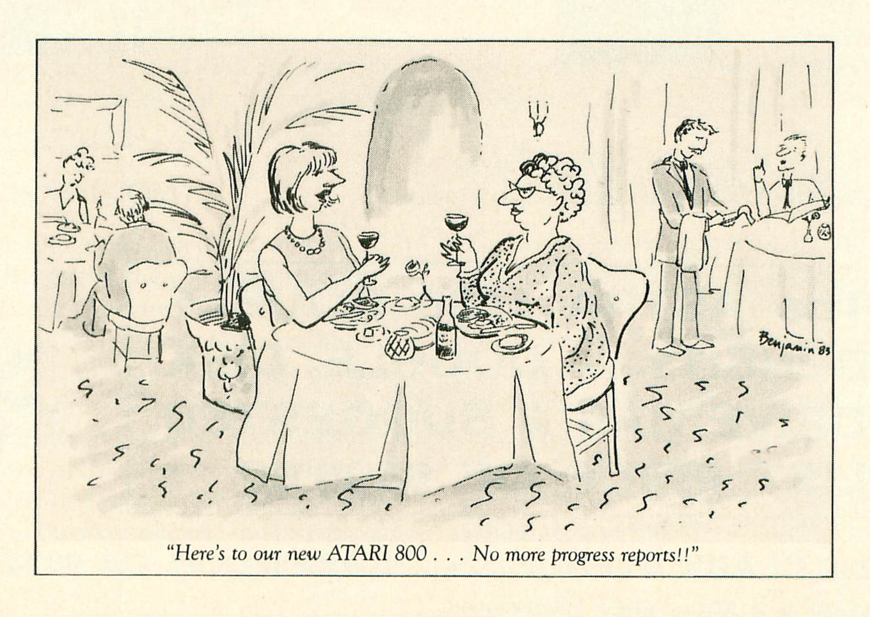
A microcomputer, especially the ATARI, is more than capable of handling an individual teacher's computer chores. We have used an ATARI 800 with a single disk drive and 48K of memory to maintain the grade records of six high school classes over the past year. This typically requires about 30 minutes per week for data entry and allows us to easily generate weekly progress reports or final grade calculations. This eliminates hours of calculation the night before these reports are required. Although this is a program of our own design, there are several available at reasonable prices that accomplish the same tasks.

Several publishers — including Milliken, SRA, and McGraw-Hill — have begun to respond to the rapidly growing education market. The amount of CMI available for the classroom expands each day, making the teacher's and administrators job more difficult due to the sheer volume of material to be reviewed. Through persistence and careful planning, it is possible to select CMI packages to augment the regular classroom routine in almost any subject. Once the individual packages have been identified, the teacher must integrate them into the instructional process so they appear as natural extensions of the traditional classroom.

On the home front, some publishers are starting to realize there is an even larger untapped audience for educational software. By incorporating some of the basic record keeping found in CMI packages, anyone can expand their educational horizons at home in a pleasant and painless manner while documenting their progress and problem areas.

NEXT MONTH

This concludes our overview of computer use in education. Over the next several months we will explore many of the special features of the ATARI computer by developing a preschool educational game.



"Here's to our new ATARI 800 . . . No more progress reports!!"

WE INTERRUPT THIS AD TO BRING YOU THIS IMPORTANT PROGRAM...

Now you could add **your** program to the rapidly expanding list of MMG Software with MMG's **Write Your Own Program Contest!** Each month a program will be chosen and developed from the entries and suggestions sent in by **you** and best of all, the winners will receive royalties from the sale of their entry. You don't have to be a computer whiz to enter, so see your local retailer who carries ATARI products for details. FINAL FLIGHT is only one of the many exciting and useful programs for the ATARI system now available from MMG Micro Software that are designed with you in mind. At MMG, we believe that people are as important as the programs they use.



NIGHTMARE MISSION
continued from page 34
at the other assemblers we have used:

• Assembler/Editor Cartridge (from Atari). This cartridge is the reason we felt queasy about buying MAC/65 from OSS; OSS in its early days designed this cartridge and sold a slightly upgraded version of it as "EASMD". This is not a professional or even particularly useful assembler; it assembles about one line of code per second. At that rate, our project would have assembled in about 3½ hours instead of three minutes. This cartridge also has some weird bugs and "locks up" during assemblies for unknown reasons. If you are developing Atari software, do not buy this cartridge for assembling, although (as we shall see) its debuggers can be useful. As an assembler, however, it will just waste your valuable time.

• Atari Macro Assembler/Editor. This was the best thing on the market for some time. It takes input from a text editor (usually MEDIT is used) and assembles from the raw source code. Naturally, this is a rather slow process, because much analysis must be performed on the source code to make sure the syntax is valid.

We used AMAC for our last large project, and while it was an improvement over the ASM/ED cartridge, it wasn't enough. (Keep in mind that hand assembling code is very nearly an improvement over the ASM/ED cartridge.) However, while AMAC is good, its overall use in the development process doesn't work out so well.

The problem? All the disk accesses to load AMAC, MEDIT, DOS Menu, and so forth, take time. Anything having to do with disk drives on the ATARI is very slow. It is a real shame there is no "direct" way to go from MEDIT to AMAC, and have both in memory at the same time.

At Atari, this problem has been partially solved by using RAMDISK — a product which emulates an Atari disk drive with RAM. Thus, going from DOS to AMAC, for instance, is very fast. However, there are two problems with RAMDISKs: 1) they are expensive and 2) if the system crashes, the contents of RAMDISK are lost.

Atari's Macro Assembler has some other really strange things about it. Sometimes the files on the destination disk get chewed up for no particular reason; I have never found the exact cause of this problem, but it always happens when AMAC is present. In addition, double density is not supported and only works sometimes. AMAC is resident in fairly low memory, so too many double-density file buffers will overwrite it. Remember, Atari doesn't support double density. If the disk to which AMAC is writing the print or object file fills up, the system crashes — just dies. No error message or anything. Furthermore, your disk's directory will be messed up following such a crash.

AMAC will assemble illegal opcodes. Try a STA #$04, for instance (an immediate STA is an impossible concept). Sure enough, AMAC will create an opcode for it, because it gets past the syntax checker.

Supposedly there is a new version of AMAC that fixes these and other bugs, but in the meantime, the slow editing/assembly development process and other problems disqualified AMAC for us.

• Synassembler (from Synapse Software). This assembler is used in-house at Synpase, with great success. I used Synassembler to develop the software for a memory board disk emulator. It has both good and bad points.

On the bright side, this is a very fast assembler. It achieves this speed by "tokenizing", or crunching down, source code as it is entered. MAC/65 also uses this process. Assembling this crunched code is a fast process, because the code already has the opcodes and operands labelled. Synassembler does not have to scan for them, as does AMAC. Hence, even long programs (a few thousand lines) assemble in a few seconds. The speed is comparable to MAC/65.

The Synassembler also includes a monitor, which I found powerful, but difficult to remember how to use. It kept me close to the user's manual, constantly looking up how to disassemble memory, change locations, and so on. I wish that there could be a standard for monitors and monitor commands so that I would not have to constantly learn new "improved" commands; I'm happy with the usual old ones. When I could figure out how to do what I wanted to do, the monitor worked well.

However, I shied away from the Synassembler for this project for a number of reasons. First, it has a different syntax for 6502 opcodes. I am used to the usual syntax from the ASM/ED cartridge and other places, and didn't want to keep looking up new instructions. Example: "ROL A" in Synassembler is "ROL"; "ROL A" makes for an assembly error. How frustrating!

Some other things about Synassembler bother me. The BLOAD feature for loading binary files loads only the first segment of the file. If you use multiple segmented files, as I do, you are out of luck. In a big project, you are practically forced to use segmented files, as charsets, P/M bitmaps, and such must start on page boundaries.

The syntax checker has problems. It gives incorrect errors on:

```
10 LABEL    ; This semicolon is
   illegal.
```

or

```
10 TXA ; This comment is also
   flagged as bad.
```

or

```
10 LDA  #10  ; whups! two spaces
   between A and #.
```

or

```
10 LDA #1 + 1 ; no space between
   parts of expression.
```

And so on and so on. (Naturally, none of this is mentioned in the manual, with the exception of stating that the syntax is "free format"; i.e., extra spaces are ignored. The manual is wrong.)

When the author gets time to go clean up these trivialities, which should be any time now, the Synassembler will be a nice tool; in the meantime, I just don't have the mentality to remember all of its idiosyncracies. I am starting from behind using the Synassembler because I am used to other syntaxes. If you are just starting out in assembly, the Synassembler might be much easier to use.

• Another assembler we could have

continued on next page

used is MAE. However, I have never used MAE, and did not have time to learn a new syntax and new debugger. On the other hand, a "leading programmer" tells me that MAE is not bad at all, but that his version is extensively modified from the original MAE. So please do not feel that I am saying anything bad about MAE.

There are some other assemblers for the ATARI, but I have not had experience with them. Which brings us to MAC/65.

MAC/65 was written by Steven Lawrow, from New Jersey, and marketed through OSS. It is extremely fast, powerful and thoroughly debugged. It is a pleasure to use.

MAC/65 consists of two parts, the editor, and the assembler. The editor is the default mode; the assembler is invoked with the "ASM" command, and returns to the editor when done. MAC/65 can be invoked in the assembler mode from OS/A+, if you use OS/A+.

The editor is line-number oriented, so those of you who have used the Syn-assembler or ASM/ED will be in familiar territory. A number of powerful editing functions are included. MAC/65 uses an internal crunched form, and converts all source code into this tokenized format. This allows MAC/65 to assemble at very high speed; if you have a thousand lines of code in memory, and type ASM, by the time you look up at the screen after pressing [RETURN], your assembly will be done.

The editor is very powerful. Let's look at some of the functions:

BLOAD/BSAVE: Load and save binary files. (Yes, it loads multiple segmented files too).

C,D: Change or Display memory immediately. This allows you to change margins, color, and so forth while in the editor.

DEL: block delete of a range of line numbers.

ENTER: A most powerful command. Allows entry of untokenized source code. The ,M option will merge the source code into the current file; this is how to add a block of line-numbered code to a current file. The ,A option allows you to enter source code *without line numbers* (translation, from AMAC files). What a thoughtful addition! It saved me a lot of work, as a lot of my code came from former AMAC files. ENTER will automatically add line numbers to the code.

FIND: Finds a given string, optionally within a range of line numbers. This is a quick and easy way to search for anything; it saves you having to LIST through a file to find (for example) a given label. Just FIND /LABEL/ instead. The optional ,A finds *all* occurrences of a given label. This provides an excellent way to list out, for editing, everything relating to one label that needs changing.

LIST, LOAD,NEW: List to printer/disk, Load a tokenized file, and Clear memory.

NUM: start auto line numbering.

PRINT: Like LIST, EXCEPT that line numbers are not printed to a disk file. Hence, you can go BACK to AMAC using PRINT. (Again, very thoughtful).

REN: Renumber. Very fast and comprehensive.

REP: Replace. Replaces any one string with another, optionally for all occurrences, optionally within a range of line numbers in the file. This is a very useful and powerful command; for instance, if you have incorrectly used a label throughout a file, you can zap all occurrences of it with REP.

SAVE: Saves internal format files to disk.

SIZE: Prints current memory allocations, and how much memory of the MAC/65 buffer is in use. There's a large amount of internal memory free (from roughly $2000 to $8000), and SIZE lets you keep track if you are running low on internal space.

Should your source code be too large, it can be broken up into several files and chained together with "*.INCLUDE*". Of course, this slows down the assembly process to disk speed.

And finally, "?". "?" does hex to decimal or decimal to hex conversions, right there, immediately. This is just in the right place, at code entry time; it saves a lot of paper and pencil work. Sometimes when I need a fast conversion I will boot up MAC/65 just for this feature.

In summary, the editor will do most everything you will ever want and more.

The assembler uses nice, standard opcodes, from the ASM/ED "standard". In fact, ASM/ED files will load in (via ENTER) and assemble directly with no hassles, which is great for upgrading. The assembler also has a powerful macro facility, which I did not have the time to learn how to use. However, the manual gives a clear example of one macro, which I will pass on as an example of how powerful the macros are:

```
10 PRINT "THIS IS AN
   OUTPUT LINE OF TEXT"
```

—WILL— assemble, and actually print that line of text to the screen, with proper macro definitions. Talk about easing the transition from BASIC to assembler! Anyway, for those of you into macros, MAC/65 has more than enough to keep you happy.

In the final stages of our project, we had two double density disks completely filled with code and third drive with DOS and MAC/65 on it (because the other disks were so full). MAC/65 would bring in the data from both drives and produce a 180 sector (dden) object file in three minutes. That is impressive indeed. (Mind you, this was using a fast drive that cut down on disk access time. But if you use a RAMDISK or Corvus drive, you will also run at this sort of speed. I would recommend it for longer programs).

What is more impressive is the lack of "surprises" in using this assembler; I did not find any bugs whatsoever. It is a pleasure to find an assembler (or any other product) where the designer did not invent a new series of commands or syntax for the users to have to learn. MAC/65 does the "good old stuff" very quickly.

In summary, MAC/65 proved to be an extremely fast, versatile assembler which greatly helped us complete our project in time. We recommend it to anyone wishing to speed up their program development.

"Next: How we debugged the program: a revolutionary technique."

SPORTS FOR THE 5200

It's that time of the year!

by ROBERT CAPPARELL, M.D.

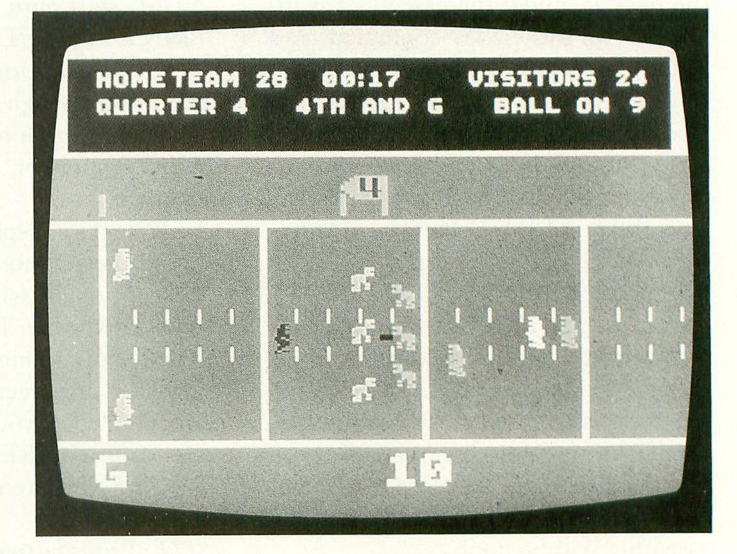
ATARI 5200 FOOTBALL

It's that time of the year! Cheerleaders, pom-pom's, fleet halfbacks and wide receivers, bulky linemen, and the star quarterback. Only this time, you're calling the signals.

Atari 5200 Football lets you be the Monday morning quarterback any day of the week. And pitted against either the computer, or your best friend, you'll find 18 offensive plays to choose from. The instructions are lengthy, but worth reading carefully. Knowing that the upper button will pass to a different receiver than the lower button is crucial and a lot of skill is involved in timing the pass.

You have the ability to transfer player control once during any play. For example, if the pass you just threw is long, you can transfer joystick control to the receiver, break the pattern, and run under the pass for a completion — a very nice touch.

This is a game of finesse and timing, and has a creative element not found in the majority of other games. The graphics are only fair but game play is good and makes up for the stick-like characters. As far as strategy goes, what works on offense greatly depends upon what the defensive alignment is, much like the real thing. I've found that almost all of the screen passes work well and are comparatively safe. However, once your timing is down pat, you'll be going for the bomb before the first quarter is over.



ATARI 5200 SOCCER

I've always believed that soccer never caught on here for two reasons: low scoring and an almost complete lack of understanding of the game. **Atari 5200 Soccer** is almost as difficult as the real thing. Dribbling and passing the ball requires a completely different set of skills than any other game. There are four kinds of kicks available and mastering them is necessary to move the ball effectively.

A switch-player option is disappointing in that you cannot select a specific fielder, but may have to switch several times before finding the right man. You have to work hard to even get close to scoring a goal. Unlike football, where every play is a potential touchdown, numerous players are required in soccer to set up a potential score.

Thinking ahead definitely pays off here, and quick reflexes along with constant movement will eventually let you feel like Pele, without the shinsplints. The graphics are a bit better than in football, but the lack of background noise and no halftime show (in either game) make this seem like high school rivalry instead of The World Cup.

Perhaps with more practice, even I could develop an appreciation for the game. I think this might be a very good sports game, but I just don't have the patience to find out! I don't believe children of less than 12 or so would come close to sitting down with this game to really become good at it.

continued on page 40

SPORTS FOR THE 5200 *continued from page 38*

ATARI 5200 TENNIS

I must admit, I'm a closet tennis fanatic. I actually get up early to watch Wimbledon. Unfortunately, my forehand, backhand, and serve leave much to be desired. It was with great expectations that I plugged in the **Atari 5200 Tennis** cartridge. What I found was only a little less demanding than facing John McEnroe at his best.

However, this sports game turns out to have real potential. I learned more about lobs, passing shots, net play and baseline volleys in 3 hours than I believed was possible. Again, reflexes and timing are critical factors here, and finding the correct buttons to press for a cross court volley can be frustrating. Making the shot work *was* rewarding, and therein lines the strength of this game. No fines here for cursing the lineman.

If you get to the ball, you will return it. Player positioning is the key here and takes practice. The color and graphics are above average, and on days when you can't make it to the courts, this might be the next best thing. This sports game is as creative as the others compared to other video games. Repetitive actions here will not improve your score, only let your opponent know what's coming. So let 'er rip. The only thing you won't need after the game is a trainer.

WHAT IS A TYPO TABLE

Newcomers to ANTIC may wonder about the "Typo Table" that appears at the end of most of our basic listings. TYPO is a program that helps you find typing errors made when entering programs that appear in ANTIC. TYPO will produce a table of values which can be used to pinpoint where an error was made. The TYPO program and instructions originally appeared in Volume 1, Number 3 of ANTIC, and was reprinted in Volume 2, Number 1. The latter issue is still available as a back issue, and the TYPO program itself is included in ANTIC UTILITIES DISK #2.

NOTE: When comparing your TYPO TABLE with the one we publish, first look at the length column. For a given line number range, if your length is only off by one or two, it may be due to spacing. Missing or extra spaces generally occur between quotes or in a REM statement. Spaces must be accurately placed for TYPO to work, so first experiment with the spacing.

THE PROGRAM STORE

Guarantee: We will ship your order for items in this ad within 48 working hours or you get a 20% rebate. (Books/non-released items excluded. Gift certificate issued. Offer expires October 31, 1983)

SPELLICOPTER™

DesignWare

Become a spelling ace as well as an ace chopper pilot with this action learning game for ages 6 to adult. Rescue the secret word, letter by letter using the context clue at the bottom of the screen. Comes with spelling lists with 400 words. Because you can create your own word lists and clues, it's perfect for practicing each week's spelling lesson. Lively sound effects, graphics and animation make learning fun!

Atari 48K Disk $39.95



CREATURE CREATOR

DesignWare

Do the Monster Match! This computer discovery game for ages 4 to 8 years is a challenging matching activity. Hours of entertainment as individuals or groups create thousands of different combinations of heads, arms, bodies and legs. Creatures can be animated with dancing steps just by pressing 6 keys. Simple on-screen instructions help children learn concepts of computer programming and pattern recognition.

Atari 48K Disk $39.95



CRYPTO CUBE

DesignWare

A three-dimensional word game, includes ready-to-solve puzzles for all proficiency levels and ages from 8 to adult. The 50 topical puzzles are interesting for everyone. Since players can type in their own words, it's the perfect way to gently lead children to greater vocabularies. The built in puzzle generator turns new lists into puzzles. What a challenge!

Atari 48K Disk ~~$39.95~~
20% OFF SALE
Now til Oct. 31
$31.96

KID GRID

by Arti Hartounian from Tronix

It's the wildest, wackiest videochase this side of the arcades. Your job is to connect all the dots on the colorful grid. Easy, right? Pac-Man looked easy too! It's harder than it looks because the bullies are in hot pursuit! Squashface, Thuggy, Muggy and Moose are all in the game. If they catch you, the results are explosive. So keep your eyes peeled for the mysterious bouncing question mark and don't slow down!

43524 Atari 16K Tape ~~$29.95~~
43535 Atari 16K Disk ~~$29.95~~
15% OFF SALE Now til Oct. 31 $25.45

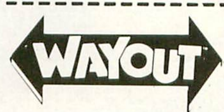
COLOR DISKETTES

GET ONE COLOR DISKETTE FOR ONLY $1.00 WITH THIS COUPON AT ANY OF OUR PARTICIPATING STORES (coupon not redeemable through mail order)

The whole disk is colored — not just the envelope! It's so hard to describe, we want you to see it. Try these premium quality disks in 5 bright colors. Try a different color for each subject or person. Available in boxes of ten, all one color for $34.50.

#40262 Green #33242 Orange
#37460 Red #29865 Yellow $34.50
#33534 Blue
#18515 Assorted Colors $39.50

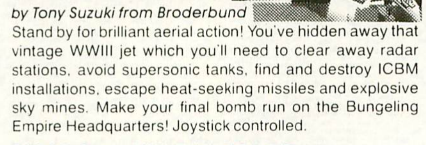
Name ____________
Address ____________
City ________ State ________ Zip ________
Type of Computer ____________ 02



by Paul Edelstein from Sirius

1983 Golden Joystick Award for best graphics! Bizarre 3-D scrolling action mazes! Select from 26 incredible journeys. You'll have a compass and a map of your travels at the bottom of the screen. Save 9 different locations or the entire game. You must avoid the mischevious hiding Cleptangle. Keep your eye on the fireflies, they'll show you which way the wind's blowing in the maze and maybe even give you a clue to the WAYOUT!

44075 Atari 32K
Disk $39.95



SKYBLAZER

by Tony Suzuki from Broderbund

Stand by for brilliant aerial action! You've hidden away that vintage WWIII jet which you'll need to clear away radar stations, avoid supersonic tanks, find and destroy ICBM installations, escape heat-seeking missiles and explosive sky mines. Make your final bomb run on the Bungeling Empire Headquarters! Joystick controlled.

34928 Atari 48K Disk ~~$31.95~~
20% OFF SALE Now til Oct. 31 $25.56

MATCH-BOXES

by Al Cheser from Broderbund

An antimated game for the family! Lurking behind a grid of 36 numbered boxes is an animated menagerie of colorful characters, creatures and objects, each with a catchy tune all its own. Uncover boxes two at a time to match pairs of light and sound to solve a hidden word puzzle. Seven different games for 1 or 2 players. A delight for the eyes, ears and intellect!

34265 Atari 32K Tape $29.95
23814 Atari 32K Disk $29.95

DEEP BLUE C COMPILER

by John H. Palevich from APX

This implementation of the Small C language fills the gap between BASIC and assembly language. C is more powerful and faster than BASIC yet clearer and less error-prone then assembly language. Now you can create C programs on your Atari- ones that contain more than a hundred lines of code. Includes a library of commands and user manual which eases the transition to C. Requires Atari Program Text Editor or other non-line oriented text editor.

24141 Deep Blue C Atari 48K Disk $39.95
28796 Program Text Editor Atari 32K Disk $39.95

THE C PROGRAMMING LANGUAGE

by Brian W. Kerrighan and Dennis M. Ritchie from Prentice-Hall

This is the first available text on the rapidly developing C programming language. It offers a detailed yet understandable explanation of all aspects of the C language. Incorporating examples that are complete programs, the text not only teaches the language but demonstrates useful algorithms, data structures and programming techniques.

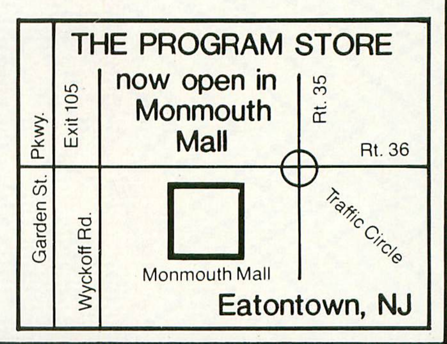
Softcover Book $17.95
SPECIAL PRICE ALL THREE FOR $77.85
A $20.00 SAVINGS!

JOY SENSOR

from Suncom

Exciting breakthrough in game controllers! Touch sensitive with no stick. Just the right combination of control and responsiveness. Includes switch to move only in horizontal and vertical or all eight directions. Moves are executed much faster — the slightest touch is all it takes.

31059 Atari Joy Sensor $34.95



Over 2500 Programs for TRS-80, ATARI 400/800, APPLE, IBM, VIC 20 & C64

VISIT OUR STORES

Tenley Mall, 4200 Wisconsin Ave., NW, Washington, DC
Harvard Square, 13 Dunster St., Cambridge, MA
W. Bell Plaza, 6600 Security Blvd., Baltimore, MD
White Flint Mall, Rockville Pike, Rockville, MD
Cherry Hill Mall, Rt 38 & Haddonfield Rd, Cherry Hill, NJ
Monmouth Mall, Rt 35 & Wyckoff Rd, Eatontown, NJ
Willowbrook Mall, 1400 Willowbrook Mall, Wayne, NJ
Nanuet Mall, Rt 59 & Middletown Rd, Nanuet, NY
Olentangy Plaza, 829 Bethel Rd, Columbus, OH
Westmoreland Mall, Rt 30 East, Greensburg, PA
Montgomery Mall, 230 Montgomery Mall, North Wales, PA
Plymouth Meeting Mall, 500 Germantown Pike, Plymouth Meeting, PA
Century III Mall, SR 51 & SR 885, West Mifflin Borough, PA
Seven Corners Center, Falls Church, VA

COMING SOON IN

CHICAGO, ST. PETERSBURG, DENVER, TAMPA, OKLAHOMA CITY, TULSA

FRANCHISE OPENINGS IN SELECTED CITIES

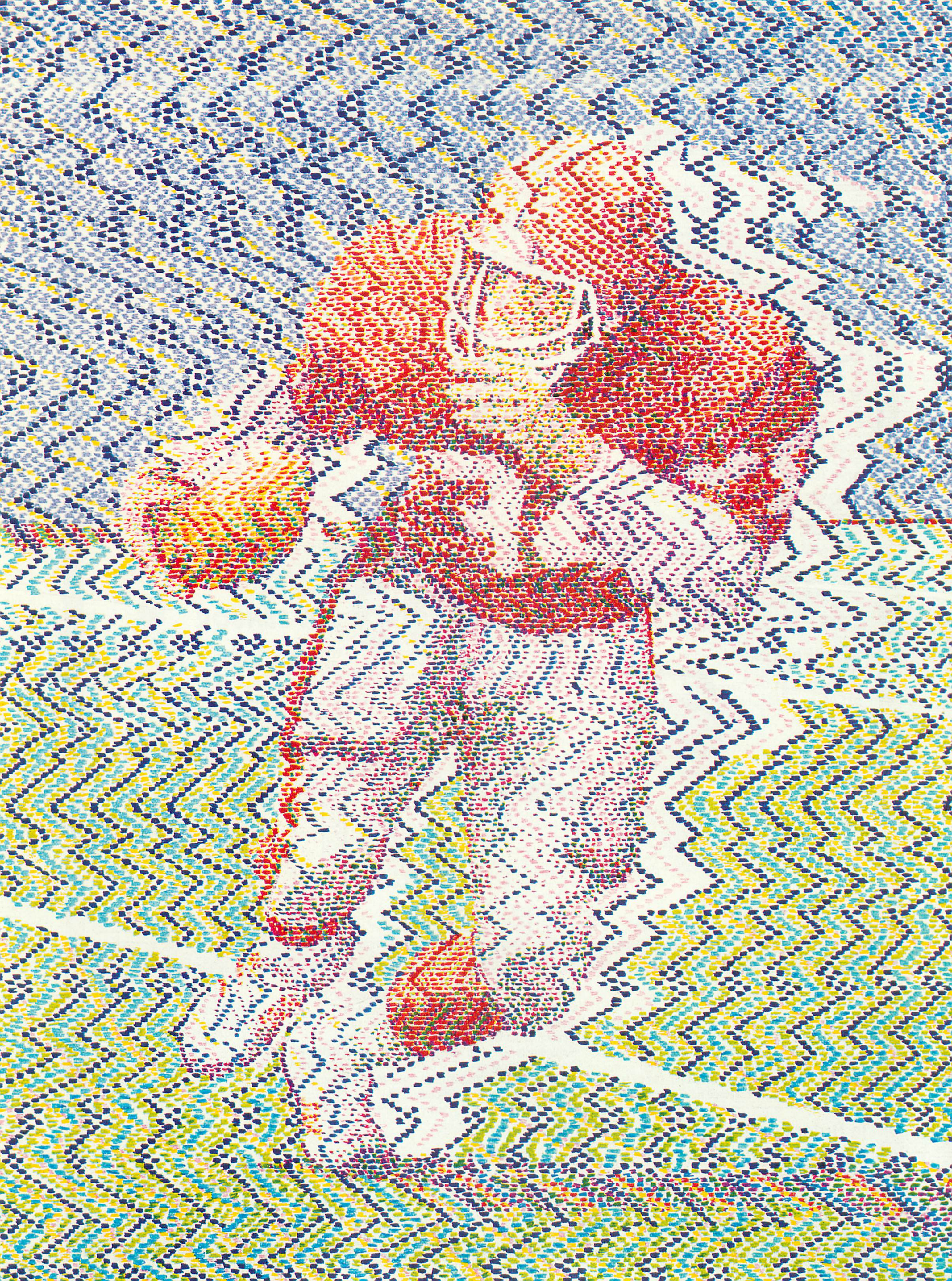
To Order Call Toll Free 800-424-2738
For Information Call (703) 556-9778



Mailorders: List computer, item, item #, qty, tape/disk, rom, book, price, shipping, tax & total. Send check or M.O. for total purchase plus $2.00 shipping and handling. VA add 4% sales tax. Charge cards — include all embossed information. List name, address, city, state, zip & phone

THE PROGRAM STORE®

THE PROGRAM STORE Dept. 02-10-3 Box 9582 4200 Wisconsin Avenue, NW Washington, D.C. 20016



GRIDIRON GRIT

Computerized football for the ATARI

by ROBERT DeWITT
Managing Editor, ANTIC

Football seems to epitomize male competitiveness when there is no national war going on. American football is my favorite sport, I admit, and it captures my attention far beyond reasonable explanation. That's why I have looked for football simulations amid the plethora of computer gameware and chosen to single them out in this survey.

There are five products so far announced that really attempt to offer football for the ATARI, plus several others that derive from soccer, the "football" revered by the rest of the world. We'll discuss them all at least briefly, and discuss in detail the degrees to which the better ones succeed in delivering the football experience.

STARBOWL FOOTBALL

Certainly the best "action" football game yet made for the ATARI is **Starbowl Football**, by Gamestar. In this very complex and difficult contest, the outcome depends, as it should, on varying your offense and defense to anticipate your opponent, and on doing the right thing in the right place at the right time.

Starbowl is so realistic it should hold a training camp to teach its rookies how to run, pass and catch. There are 196 different play possibilities — considering both offensive and defensive strategies — and even then the outcome of each play depends heavily on the actions of the ball carrier and the free safety, who are controlled by the joysticks of the opposing players.

Two-player mode is probably best with Starbowl, even from the beginning; a fellow klutz will be much easier to defeat than the computer. In my first game against the computer I was whipped 96 to nothing. Against another human you will at least share the learning curve as you assimilate the patterns of joystick maneuvers that direct the behavior of the other five men on your team.

Each team has six men, and believe me, you won't want more! The three down-linemen on each side work as a group. On offense they can pass protect, sweep left or right (up or down, actually), or trap up the middle. On defense they rush the passer, counter the sweep, or jam the middle. The center hikes the ball on signal from the offensive quarterback.

continued on next page

Illustration by STUART GOLD

GRIDIRON GRIT

The offense has two receivers. Each can run one of four patterns each play: a fly, a square-out, a slant-in or a screen. Only one can catch the pass, and you must pick (in secret) the eligible receiver before the play starts. The single offensive back is the quarterback, who receives the ball from the center, and who can then run in any direction (under joystick control) or pass the ball to the designated receiver. To make a catch, the human controller must press the trigger precisely when the ball and the receiver collide. If this succeeds, the receiver can then run under joystick control until he is tackled, forced out of bounds, or he scores.

On defense the cornerbacks are programmed by the defending player each play to counter the patterns of the receivers, and if they are close when the ball arrives, the pass will probably be incomplete. The free safety, under joystick control, can move at will, and can intercept a pass if the fire button is pushed as the ball crosses his path.

If this sounds elegant, it is. It is also difficult, and reasonably good games require several hours of practice play to get the feel for timing, angles, and the prowess of the opposition.

Starbowl is full of nice touches. All the standard football parameters are retained. The field is 100 yards long, and each yard is marked. The game has four quarters (periods of play) of 15 minutes each, and the direction of play alternates with each quarter. There is a 30-second play clock during which offensive and defensive signals are called. There are penalties for "encroachment," "interference," "delay of game," and fumbles are randomly inserted. Kickoffs and punts vary in length, and fieldgoal attempts are less accurate at greater distances.

The players are neatly animated little men — one side red, the other blue. The ball carrier is black, and has two special postures: one an ignominious sprawl when tackled, the other a victorious dance when he scores a touchdown.

If deficiencies must be found, I would complain about the fast pace of the game. It is played in "real-time," and deciding upon and programming an offensive or defensive play in 30 seconds was hard for me, especially against the computer that plays so very well. I found myself numbly repeating past plays just to get them in under the time limit. There is supposed to be a "pause" function separate from the official time-outs, but I couldn't get it to work. It also seems inordinately hard to complete passes that the computer, as opponent, never seems to miss.

Gamestar offers to enroll you as a Starbowl Allstar if you can beat the computer by 14 points. I think they'd be safe offering a $10,000 prize for that feat. The game comes on cassette or diskette, requires 24K RAM, at least one joystick, and costs $31.95.

ATARI FOOTBALL

FOOTBALL by Atari for the ATARI computers may also be available this year. It too is a six-man game played on a scrolling playfield of one hundred yards. In many respects it is similar to Starbowl, but has fewer offensive and defensive plays (fifteen offense and five defense). It is otherwise identical in its play features to Atari FOOTBALL for the 5200 game machine (see our Games Department this issue).

There are several aspects of Atari FOOTBALL that are attractive. It has a practice mode that allows you to become familiar with the mechanical aspects of game play — especially passing and catching — against a "lazy" computer. Unfortunately, the computer is not programmed to be a real opponent, so you will need a human one and two joysticks to play a real game.

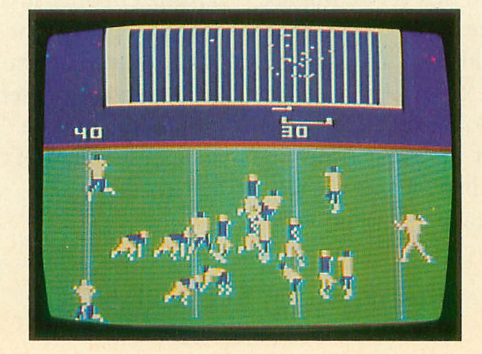
The best features of Atari FOOTBALL are the passing tactics. Either of two eligible receivers may be selected *after* the ball is snapped. Each runs a pass pattern with a "cut point." Completion depends on the quarterback releasing the ball when the eligible receiver makes his cut. If this timing is right, the receiver catches the ball. This gives the human player a chance to maneuver the receiver immediately if the pass is complete. It is much easier to learn this technique than the split-second timing of Starbowl.

The game clock runs twice as fast in Atari FOOTBALL as in real time, so a "regulation game" can be played in half an hour. There is also a "short game" that takes only about fifteen minutes.

Also, there is no 30-second clock as such. If the offense has not called a play within 30 seconds after the previous one, the clock stops until a play is called. Either player can pause the game between plays for any reason, which I frankly find helpful, but this removes one of the realistic aspects of football — time pressure.

Atari FOOTBALL will be cartridge based, a significant attraction for all game players, and will sell for $49.95.

Superbowl by Nexa



GRIDIRON GLORY

Another approach to computerized football focuses not so much on action as on prediction — the coaching game rather than the playing. **Gridiron Glory**, from APX, is one such for the ATARI. Here an attempt is made to analyze the actual experiences of known teams to arrive at a likely outcome of a given play against a given defense.

Gridiron Glory uses the results of the 1982 season of the professional National Football League as a data base for matchups between any two of these teams. Thirty different statistics were selected by the authors, Mike Drury and Bob Graves, to govern the outcomes of individual plays. Some of these statistics are reduced to "power ratings" for each team, which the players can use to choose their plays.

Plays are chosen by joystick and keyboard, and are far less complex than in Starbowl. There are eight offensive plays — four runs and four passes. There are six defenses: standard, short yardage,

spread, short pass, long pass and blitz. A matrix of these reveals that some combinations of offense and defense strongly favor one or the other; some slightly favor one or the other; and some favor neither.

Each player chooses an offensive or defensive play in secret, the computer consults its statistics and determines an outcome. This is displayed by movement of the ball on the green strip of turf scrolling at the bottom of the screen. No players or action are shown other than the figure of the referee, whose position indicates possession of the ball, penalties, and such.

Many football occurances are figured into the game, and it's a shame that they aren't more graphically apparent. For example, a kick might be blocked, a pass intercepted, a fumble might occur, the quarterback sacked; yet only the result of the occurance is shown. The experience is like reading the report of a football game as it comes in on ticker tape.

This game varies some parameters from real football. It has eight-minute quarters, and a 25-second play clock. It is easier to learn and play than Starbowl and Atari FOOTBALL, if less satisfying graphically. In actual competition the main excitement comes from trying to discover the habitual weaknesses of your opponent's play-choice pattern, and that's a valid enough premise for a lot of fun.

Gridiron Glory must be played against a human opponent, comes in diskette only, requires 32K RAM and two joysticks. The price is $24.95.

FOOTBALL STRATEGY

Avalon Hill is reknowned for its strategy board games, especially combat simulations, and recently its Microcomputer Games Division has implemented **Computer FOOTBALL Strategy** for a variety of computers. It is available on cassette and diskette for the ATARI.

Like Gridiron Glory, CFS pits known teams against each other, but in this case offers seventeen great teams from the whole history of the NFL. I chose the San Francisco Forty-niners of 1981 to battle its arch-rivals, the then-Oakland Raider team of 1976. It isn't clear from program operation, or documentation, whether the computer actually consults statistics on these teams in order to calculate results, but this is implied. Once the result is calculated, the play is animated for you, though you can't affect its outcome. The animation is rather crude, but the action is clear and fun for a while.

One player may challenge the computer, or two players can match up. In the two-player game each chooses a play (21 for offense, 11 for defense) by "cycling" through choices. The really interesting graphics in Computer FOOTBALL Strategy are in the schematic displays of offenses and defenses, which change visibly as you cycle through them. Seeing the choices significantly assists in play selection.

Defense selects first, so the offense can see what it's up against. The offensive play can then be picked with greater care than would be true in real-life, and neither player can rescind a choice. The clock is running only during play, and time spent choosing plays is not measured or penalized.

After completion of a play, the result is displayed in writing, and the ball is spotted appropriately on the field. I was disappointed, when I scored against the Raiders, that my only visual reward was the written message "TOUCHDOWN — XP GOOD." There was no animation of that play, no victory dance. Nevertheless, I appreciated CFS's efforts to enliven the otherwise static contest with some animation. The game requires 32K RAM, at least one joystick (two for human opponents), and costs $21.00.

SUPERBOWL FROM NEXA

The blockbuster of computer football is scheduled for release this month, NEXA's **Superbowl Football**. It will have two diskettes and requires 48K RAM with joystick(s). The game was in development at the time of this writing, but I was able to see significant pieces of the project on company premises.

Superbowl Football comes closer to real football than any game yet developed for any computer. You will play it against the computer or a human opponent. It has eleven men per side, and each man is programmed specifically for each play — of which there are 1,000 each for both offense and defense. If these aren't enough, you can design your own plays with a "play editor." Each player selects 100 plays to be used in a given game "half;" these constitute the "playcard." Individual plays are called from the playcard by cursor-controlled menu selection. During play each programmed man carries out his assignment, while the human players control either the ball carrier (offense) or the free safety (defense).

Needless to say, every kind of play is possible — including laterals, double reverses, fake punts, and draws. All penalties and mishaps are possible, except injuries. Each man is invested with a degree of speed and power, which is used to determine the outcome of actions relative to another man. The ball, when thrown, goes to a programmed spot. The receiver must be there to catch it, or close enough to make a diving catch (via fire button). Tackles are not automatic, but computed based on the speed and power rating of the tackler(s) relative to the ball carrier.

Play is displayed on a split screen. The top half represents the full field of play, with colored dots indicating positions of players and the ball. The bottom screen animates all the players within a certain distance from the ball, an image similar to a wide-angle TV picture. Within the confines of the called play, the human player can vary the action, including selection among four possible pass receivers after the ball is snapped.

Actual play speed will be about one-half real time, which means that you have a minute for selecting each play, rather than 30 seconds. This also makes it possible to exercise more control over the joystick-controlled men.

Superbowl is the brainchild of Gilman Louie, whose young company has been working on the project for almost a year. He thinks it will be a classic, and it will sell for $49.00. I just hope it's not too hard to play.

SOCCER

Conceptually, soccer is a much simpler sport than American football, requiring one team to kick the ball into the other team's goal — one point accruing for that accomplishment.

Computer implementation of soccer is simpler than for American football.

continued on next page

GRIDIRON GRIT

The number of players can be reduced without damage to the game concept, scoring and time keeping are easy, and the playing period can vary. The most difficult programming tricks involve ball movement and player control, including "stealing" from the opposing side.

Thorn EMI has a marvelously well-detailed and animated game called **SOCCER**, that is on cartridge. It displays all eleven men on each team, as they course up and down the scrolling playfield.

The players on each team are programmed to play pretty good soccer. The computer can play against itself in a very impressive demonstration game. One, two, three or four humans can join in with joysticks to control a front player or a goalie of either team. You can pass the ball to designated members of your team, in four different ways, including shots on goal, which have extra speed.

The delicacy of design for Thorn's animated players, and the pace of the game are exceptionally good. It is convenient to play and only requires 16K RAM. It costs $44.95.

GAMMA SOCCER

Gamma Software's **SOCCER** is a well-designed implementation of this sport — for two, three or four human players. Each side has four men who play on a field completely visible at all times (no scrolling playfield). Two of the men on each side are "smart," (programmed to play by computer). The goalie and the main player on each side are controlled by human players using joysticks. The four-player mode, with two on a side, is a tough competitive match.

Kickoffs and kicks from out of bounds are computer controlled. Once in play in bounds, the ball goes from player to player as directed by the joystick. Defenders can take the ball away by contacting the ball with a foot. All of the major features of soccer are replicated here, but you must have at least two human players (and two joysticks) to play. The computer is not programmed to be an opponent.

The game comes in cassette or diskette and requires 16K RAM. $29.95.

KICKBACK

If all this complexity has got you down, perhaps **Kickback** by Thorn EMI is for you. It's a simple little soccer takeoff you can figure out without instructions. Pop in the cartridge and wiggle the stick. Eventually you will boot the ball and see it carom about until the opposing team gets it in your goal or vice versa.

Meanwhile, the ball turns black when you kick it and scores points for you. It turns blue when it hits your "by" line and takes points away. The object is to score as many points as possible before three goals are scored against you.

It's a one-player contest with the simple challenge of kicking the ball over your opponent's goal line, which is where all this monkey business started — on the playing fields of Babylon.

CHEERS and BOOS

by DAN GUTMAN

George Plimpton was right. Atari's **Home Run** baseball game may have been the worst-looking and poorest-playing video game ever invented. Instead of nine players on a team, you had three, and when you moved the joystick, all three of them moved as a unit. The game looked as much like baseball as Howard Cosell looks like Jim Palmer. The other early Atari VCS sports games, **Basketball, Bowling, Football, Golf, Volleyball,** and **Pele's Soccer**, were uniformly inferior compared to Intellivision's offerings.

Sports games are tough. While most games give a designer the freedom to create new and imaginative scenarios, sports games must resemble real life. That baseball diamond has to be shaped like a diamond and there have to be nine players on it. There also must be a ball and the capacity to throw it anywhere on the field. All the traditional and complicated rules of baseball must be adhered to. That's a tall order for any game, much less a game jammed into a 4K cartridge. Nevertheless, video game designers have been unable to resist the temptation to turn every real sport (except maybe bocce ball) into a home game. And in the last year, as they have learned to wring more and more complexity out of the Atari VCS, their efforts have paid off. The following are some of the best sports games for that system.

GAME . . . SET . . . MATCH . . . RESET

Pong was the first video sports game, but we have come light years since 1972. Both Atari's **RealSports Tennis** and Activision's **Tennis** are excellent versions of tennis, and are nearly identical. We get a view from behind one player, the view we are familiar with from watching tennis matches on television. You can move your player all over the court and you hit the ball merely by running into it — no need to swing a racquet. The red button is used only to serve. Both games automatically keep score for you. Though both companies claim that you can direct your shots cross-court or down the baseline, this is almost impossible. Both games are fast, furious, and a lot of fun, especially against a human opponent. An added attraction is the perfect shadow following the ball in flight.

There are slight differences in the two games. Atari's is a little cleaner looking — players wear colored tennis outfits, the net has holes in it and you can actually punch an eight-letter name in the screen for each player. In Activision's game, however, the computer is a little tougher to beat.

Activision also has a somewhat similar **Hockey** cartridge. In this game you and your opponent each have two players and you bat the puck in one direction or the other with your stick. The game is very good and has all the elements of real hockey. Except for the fistfights.

THE NEW NATIONAL PASTIME

With just one joystick and nine or 12 players to control, it is debatable whether or not team sports like baseball and football can be successfully translated into video games. There is just so much going on. However, both Atari and archrival Mattel (with their M Network line) have come up with some pretty good efforts that go far beyond the first Atari sports game.

Like the tennis games, Atari's **RealSports Baseball** and Mattel's **Super Challenge Baseball** are very similar. Both games field nine players and feature pitching, hitting, baserunning and fielding. But this time Atari has the better game for several reasons: In the Atari game you can play either against the computer or against a friend, while Mattel requires that you have friends in order to play their game. You can hit home runs in the Mattel game, but all batted balls are grounders — something I can't figure out. The Atari game has a clever feature — the VCS randomly decides which of your pitches will be accurate. So like in real baseball, you may have a

continued on next page

Nolan Ryan fastball one day and the next day you could have nothing on the ball.

The two companies go head-to-head again with **RealSports Football** and **Super Challenge Football**, and this time it's a toss-up. Both have scrolling playfields. The Mattel game, amazingly, does not have any kicking in it, but unlike the Atari game, you can program the actions of every player on your team individually. On the Atari game, you can kick field goals and the crowd cheers your good plays, but Mattel has the field marked off for every yard, not every ten. Both are good games, if you want to play football on your TV set.

Some sports don't lend themselves to video games very well. It's doubtful that we'll ever see a good bowling or golf cartridge, and why would you want to? The precision of rolling the ball or swinging a club can't be duplicated as long as we have joysticks with simple on-off fire buttons. But there are some other unexpected sports that have been turned into video games that are quite good . . .

Track and Field — Amazingly, two companies are about to release nearly identical games before the 1984 Olympics. Activision's **Decathlon** and Starpath's **Sweat** both contain all ten events of the decathlon, an incredible accomplishment. Running, long jumping, discus throwing, javelin, and pole vaulting are all included in these games.

Driving — Some people may not consider auto racing a sport, but just about every video game company has at least one such game and Activision has three. The best is their **Enduro**, in which you drive your car on dangerous twisting roads through darkness, snow, and fog. Atari's **Pole Position**, translated from their hit arcade game, is also very good, although it tends to look better than it drives. The 5200 version of the same game is excellent.

There are others — boxing, skiing, swimming, checkers, chess, bridge, pinball, basketball, and more — in varying degrees of success. Playing VCS sports may not be as much fun as going out and whacking a few fungoes in the sun, but at least you don't have to worry about busting any windows.

LINE ZERO

A little file protection scheme

by BOB FENIGER

This one line program will prevent your programs from being listed once they have been run. Although not a serious file guard, LINE ZERO will confound anyone without knowledge of the program unless they happen to use the SYSTEM RESET key. This last puts the Entertainment label on the program. Just follow the nine step-by-step instructions. Step 3 contains the entire LINE ZERO program.

1. LOAD or ENTER a program from disk or cassette. In this example, we will call your program NOTES.
2. LIST the first few lines of NOTES. If there is a line 0, renumber it to a higher number. Otherwise, make no changes.
3. Type in line 0, exactly as follows:

```
0 POKE 694,9:POKE 755,
  4:POKE 756, 0:STOP
```

4. This line is now included in the program. Save this new program as "NOTES.II" if you have a disk drive, otherwise CSAVE to a different tape.
5. When the new program is saved, switch the ATARI off, then on again.
6. Type RUN "D:NOTES.II" or rewind the second tape and type RUN"C:". An unusual pattern should now be displayed. Don't be concerned — this is part of the protection.
7. Press [BREAK] two or three times. You won't see the display change much, but that's expected. Now type this:

```
YFBL><?%;;=          press [RETURN]
```

The screen should clear at this point. If not, press [BREAK] two more times and try again. When you clear the screen, you won't need a mirror to read it if you enter these nine characters:

```
YFBL><<%8            press [RETURN]
```

8. Now key in 9. This is the program code for 0 and thus will delete line 0. You should now be able to LIST, RUN, DOS, etc. Although line 0 is no longer in the version of NOTES.II that resides in the computer, it is still in the SAVEd version. If you wish to edit, remember to replace line 0 before you SAVE again.
9. To exit the code, type:

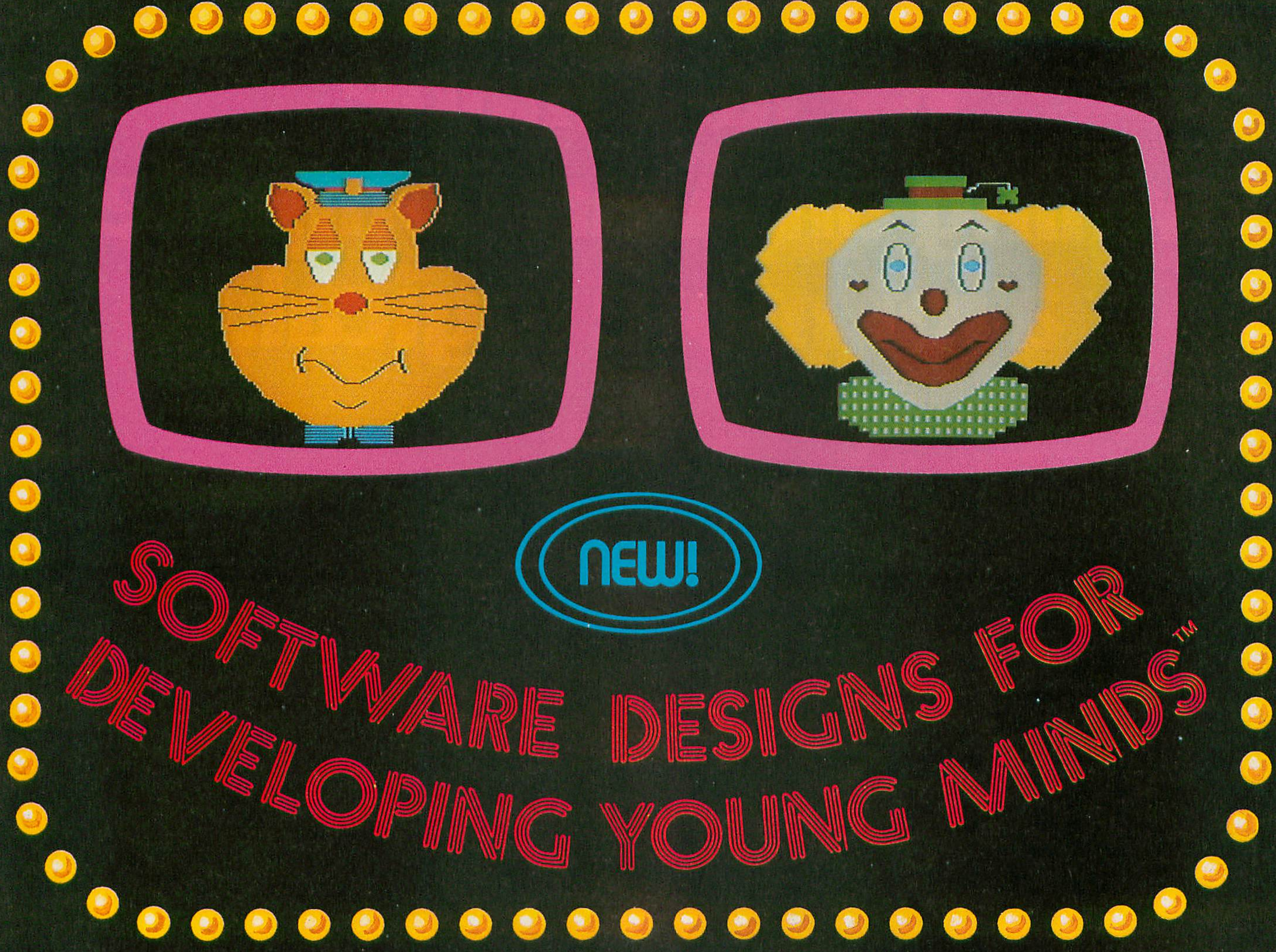
```
YFBL?0 = %9          press [RETURN]
```

This will return the regular ATARI character set.

By skipping the ninth step you can LIST, RUN, DOS, etc. by using this code table. It is possible to even write new lines or edit existing lines by using the code table. Try E@Z] for LIST, [± G for RUN, and MFZ for DOS. If you access DOS the code set will still be in effect. [SYSTEM RESET] will return you to BASIC as well as restoring the normal character set. [RESET] will solve most problems if things get a bit clogged up. Any program may be similarly protected by adding LINE ZERO and repeating the above steps. Here is part of the character set code that results when a 9 is POKEd into memory location 694.

A = H	K = B	U = \	4 = =	[= R	! = (	$ = —
B = K	L = E	V = __	5 = <	] = T	(= !	& = /
C = J	M = D	W = Λ	6 = ?	\ = U	# = *	/ = &
D = M	N = G	X = Q	7 = >	= = 4	* = #	
E = L	O = F	Y = P	8 = 1	__ = V		
F = O	P = Y	Z = S	9 = 0	: = 3		
G = N	Q = X	0 = 9	, = %	; = 2		
H = A	R = [	1 = 8	“ = +	? = 6		
I = @	S = Z	2 = ;	^ = ’	< = 5	spacebar =)	
J = C	T =]	3 = :	0 = W	> = 7	) = blank space	

SOFTWARE MOVIES™



MAXIMUS, Inc. is excited to present two new educational software movies for kids of all ages . . . and more are on the way!

STORYLINE™ makes bedtime, or anytime, a warm and friendly funtime. Clover the Clown is your tourguide for two fairytales: The Ugly Duckling and Rumpelstiltskin. Through computer magic you become a part of each story!

SAFETYLINE™ combines fun with important lessons about safety. Max the Cat shows you how to cross the street safely going to school and what to do when lost at the zoo.

Both software movies have interactive games that reinforce the fun and learning. Both have real human voices; you don't need a voice synthesizer!

Features of the software include:

- Sophisticated Face Animation
- Lip-Synchronized Voices
- Original Musical Scores
- Superior Full-Color Graphics
- Optional Joystick Control
- Machine Language Programs

Relax and enjoy yourself. Let Max, Clover, and their colorful friends guide you through a new world of fun and learning. You'll be amazed at how real they are!

STORYLINE™ and SAFETYLINE™ are currently available for any Atari computer with 48K. Each software movie comes in either CASSETTE ONLY ($29.95) or CASSETTE/DISK ($34.95) versions. Order by mail or phone. Visa and Mastercard welcome. Include $2.50 postage and handling; Virginia residents add 4% sales tax. Dealer inquiries invited. Write for our free catalog. MAXIMUS, Inc., 6723 Whittier Avenue, McLean, Virginia 22101.

ORDER TOLL-FREE 1-800-368-2152

MAXIMUS *...Where Excellence is the Standard*

Adventureline™ Series Coming Soon

We just made owning an Atari computer a lot more logical.



Introducing the Rana 1000 disk drive. It's a whole new game for Atari computers.



This two digit LED readout displays a code that tells you everything you need to know.

This beeping button tells you your write protect feature is keeping your information safe.

The remaining buttons beep when touched, and provide readouts on density storage, error status, and drive number.

This button beeps when you touch it, and the LED readout tells you what track you're on.

When Rana Systems introduced the Elite Series of Apple® compatible disk drives, we didn't know what a tremendous impact they would make. It turned out to be a line so outstanding in performance, styling, capacity, and price, that it instantaneously made us a major force in the market. Well, needless to say, the response was so great that we were forced to create the same highly advanced disk drive for Atari.® A disk drive that when coupled with Atari's computer, could perform everything from accounting, financial planning, and stock charting, to word processing, business management, and letting you write your own programs. Plus, we made it simple enough for a child to use, for learning anything from the alphabet to a foreign language.

Working with a diskette versus playing with a cassette.

Let's face it. The only reason Atari made a cassette option to their computer was to make it affordable. But now you don't have to settle for less. Because now you can get a diskette for your Atari computer which outperforms their cassette and costs ⅓ less than their disk drive. With Atari's cassette you only get half the functions of a computer compared to what our floppy disk can give you. Their cassette is not only limited in the software available, but it also takes 20 times longer to get the information you need. And Rana's disk drive offers twice the storage capacity of either their cassette or disk drive.

Why even stylewise our new low profile design not only looks 100 times more spectacular, but it occupies 3 times less space. And our new Rana 1000 also gives you a piece of its mind every time you use it, because our disk drive gives you information as well as takes it. And we think that says a lot.

The disk drive that has all the answers.

Rana offers you a myriad of features Atari couldn't even conceive of. Like five electronic functions on the front panel that actually beep and give you a LED readout when touched. Our disk drive tells you what track you're on, and what density and how much information you're storing. It lets you switch from a single density of 90,000 letters to a double density of 180,000 letters, on a single diskette. And, we have a write protect feature which protects your diskette from being erased. In fact, no other disk drive can offer you that.

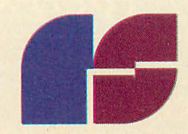
As you can see, it was easy to build a disk drive superior to Atari's. Because for every reason you buy a disk drive, Rana has superior technology.

The Rana 1000 disk drive. It brings your Atari computer to a higher level of sophistication for a price one third lower than Atari's. So your choice shouldn't even be a matter of logic.

Just common sense.



Always a step ahead of the originals.



21300 Superior Street, Chatsworth, CA 91311 213-709-5484. For dealer information call toll free: 1-800-421-2207. In California only call: 1-800-262-1221. Source Number: TCT-654

Available at all participating Computerland stores and other fine computer dealers.

®Apple is a registered trademark of Apple Computer, Inc. ®Atari is a registered trademark of Atari, Inc., a Warner Communications Company. See us at the West Coast Computer Show. Circle 44

MAKE A FACE
Parallel printer interface for peanuts

by ALAN MACY

Requires 16K RAM and printer

Even inexpensive dot-matrix printers cost several hundred dollars, so I think it's a shame that ATARI owners are expected to shell out a couple hundred more for a parallel printer interface. I recently bought a printer for $290, and was unwilling to pay half again what it cost just so the ATARI could talk to it. Instead, I wrote a routine, which I present here, that allows the computer to communicate with a standard printer through the joystick ports on the front of the machine. By altering the Operating System's "device table", I can even use all of the standard print commands, such as LIST "P:" and LPRINT.

To help you get this interface working, I will first discuss some theory, namely: how a parallel interface works, how to send data out the joystick ports, and how to alter the device table. After that, I will describe how to make the cable to the printer, and how to implement the routine. If you're not interested in the theory, skip the first section.

PARALLEL INTERFACING

A parallel interface is one of the several standard ways for a computer to send bytes of data to a peripheral device, such as a printer. In parallel transmission, all of the bits in one byte are sent at the same time along separate wires. First, the computer checks to see if the printer is busy doing something, perhaps printing other characters. It does this by looking at the voltage on the "busy" wire, which is controlled by the printer. If the printer is busy, the computer must wait patiently for it to finish what it's doing before going on to the next step. When the printer is ready, the eight bits of the byte are presented on eight separate wires; a low voltage signifies a bit of 0 and a high voltage of bit of 1. The computer pulses the voltage of another wire to say: "The character is ready, come and get it!" The wire used for this signal is called the "strobe".

This communication between computer and printer ("printer busy", "printer still busy", "printer ready", "character ready", etc.) is commonly referred to as "hand-shaking," and permits the orderly transfer of data from the computer to the printer.

Now you can see why we need three joystick ports for our parallel interface. Eight wires are necessary for the byte, with additional wires needed for the hand-shaking.

DATA OUT OF THE PORTS

When you use the joystick to play a game on the ATARI, all of the wires in the joystick ports are set for input. When you press the trigger, for example, one of the wires is shorted to ground, giving the computer information that it can use to make something happen. However, you can reconfigure these ports to send data out instead of in. The output signals may be used to control lights, your electric coffee pot, or, for the case considered here, your printer.

All we have to do to print a character is wait until the printer is ready, present a byte of information at the ports, and pulse the strobe wire.

To reconfigure PORT A (jacks 1 and 2), we first clear bit 2 of the control location PACTL (54018), and then store a byte into PORTA (54016) which specifies the direction of subsequent data flow. Each bit of the byte corresponds to one wire of the port. If this bit is equal to 1, that wire will be set for output; if it is zero, that wire will be used for input. For example, storing a binary 00011001 (decimal 25) in PORTA configures three of the wires for output and five for input. Once this is done, you must set bit 2 of PACTL back to one in preparation for using the port.

After repeating this procedure with PBCTL (54019) for PORT B (jacks 3 and 4), you may print a character using the routine presented below, which waits until the printer is ready to receive a character, presents the character at the ports, and pulses the strobe to tell the printer that the character is available.

continued on next page

Alan Macy, Ph.D., is director of software at DesignWare, a company developing educational computer games for microcomputers.

ALTER THE DEVICE TABLE

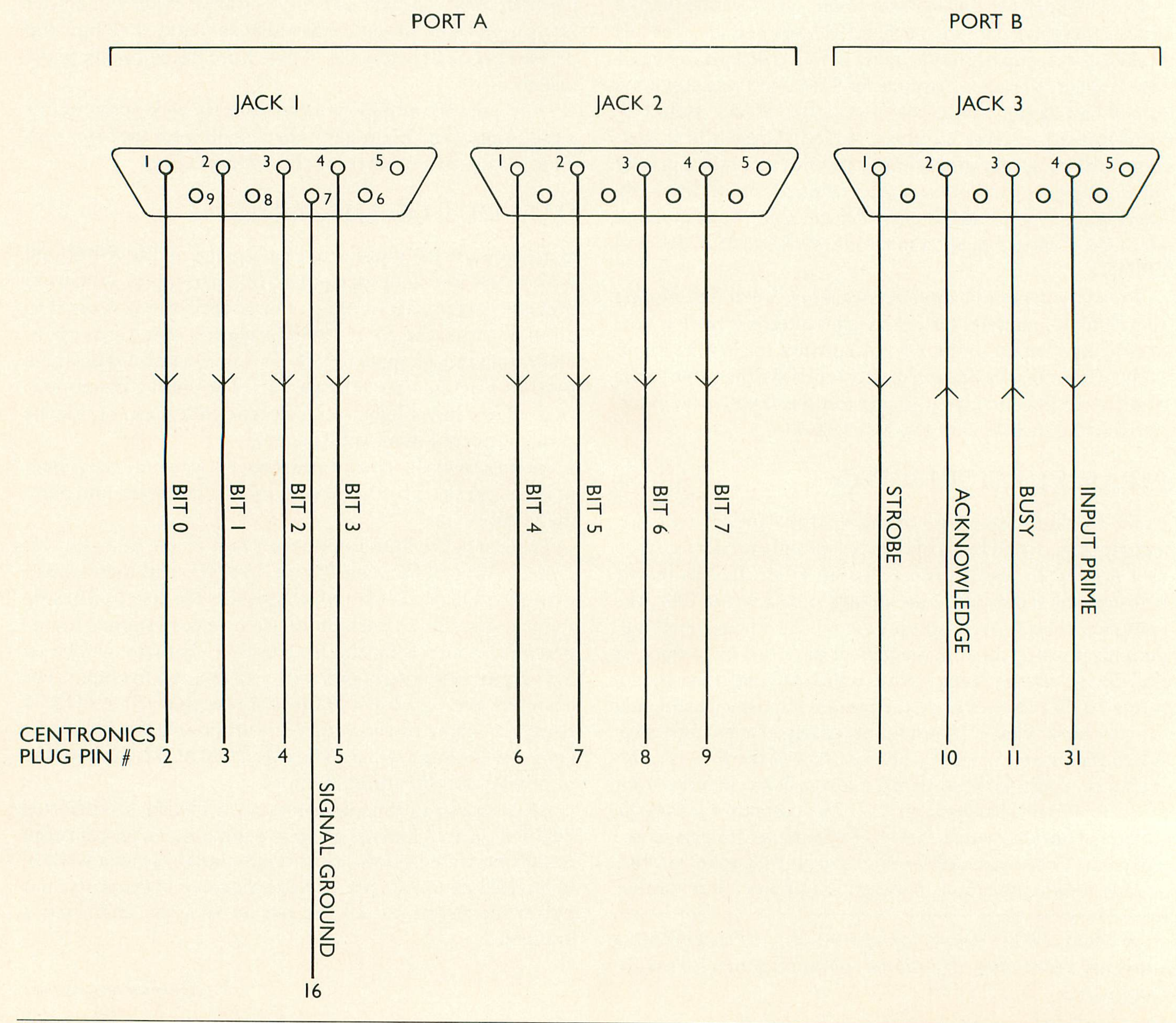
The ATARI Operating System sets aside a group of memory locations to use as a "device table". This table tells the computer where to find the routines for different output devices.

If you were to look in locations 794 (decimal) and following, you would find a series of one letter ID's (e.g. "P" for printer, "C" for cassette, etc. . . .) each followed by a two-byte address. Each address points to another table which contains a set of pointers or "vectors" to different routines for the specific devices (for more detail on this, see page 123 of the Atari Technical Reference Notes). These include routines for opening the device (called when you execute a OPEN #7,8,0,"P:", for example), sending a character to the device, closing the device, etc. If we want to access our own printer code using standard BASIC commands, we need to construct a vector table which points to our printer code and then change the pointer in the ATARI's device table to point to our vector table. It's as if we are telling the device table:

"Look, I have a vector table that points to some routines for printing characters. It's located at memory location 1536. When the Operating System asks you where it should go for the printer vector table, please give it my address." Later, when we execute a printer command, such as LIST "P", the Operating System will go to the device table to ask it about printer routines, and the device table will direct it to our routines. In the case of our printer routines, we set the "OPEN" vector to point to the code that reconfigures the joystick ports, and the "PUTBYTE" vector to the code that sends one character to the printer.

Note, however, that whenever [SYSTEM RESET] is pressed, the Operating System will reinitialize the device table. Thus, whenever this key has been pressed, you must alter the table again so it will point to your own routine.

Figure 1



MAKING THE CABLE

To make the cable, you will need the following hardware:

1. Three female DB-9 plugs. I suggest you use the all-plastic ribbon cable type. You may have to search around for these.
2. About 10 feet of cable. If you use ribbon cable, get it with 25 conductors. Although you won't need all the wires, it will help you to make good strong connections.
3. One Centronics-type, 36-pin male plug. This will plug into the printer.

When you've bought these items, you're ready to warm up your soldering iron and put things together. The pin connectors should be made according to the diagram below.

Although the "input prime" and "acknowledge" wires are connected, they are not used by the routines I've presented here. This wiring diagram assumes a standard parallel interface. You should check your printer manual to make sure it isn't different.

If you use ribbon cable to make your cable, you can simply snap the DB-9 plugs onto the cable at the ATARI end, and solder the wires to the Centronics plug at the other end.

IMPLEMENT THE PROGRAM

One way to get the program into your computer is to type in the assembly language program shown in Listing 1, using the ATARI Assembler/Editor cartridge. This way is best if you are familiar with assembly language programming, since it allows you to easily customize the program to suit your particular needs. Once the program has been entered and assembled, you may save it to disk using one of the options discussed in the Assembler/Editor or DOS manuals.

When the program has been loaded, and you are ready to use it, you must alter the entry in the device table. First, check that location 794 ($31A) contains the ASCII code for the letter P (decimal 80), insuring that locations 795 and 796 hold the pointer to the printer vector table. Next, change this pointer to direct the Operating System to our own vector table which resides at location 1536 ($600). In BASIC, this is done with the statement:

POKE 795,0:POKE 796,6

In the Assembler debug mode, you may use the statement:

C31B< 0,6

When these steps have all been carried out, you are ready to use the standard printer commands to list programs or print data. For example, to list a BASIC program, simply type:

LIST "P"

The second way to implement the printer routines is to type in the BASIC program shown in Listing 2, and run it. Once it has been run, you don't need it around anymore (until you press [RESET], and you will be ready to use all of the standard printer commands. For example, the command:

LPRINT "CURRENT VALUE OF X: ";X

may be used to record the value of the variable X on paper.

If you store the BASIC program in the file "D:PRINTSET.BAS", you may set up the printing routines at any time with the command:

RUN "D:PRINTSET.BAS"

SUMMARY

I've presented an inexpensive way to interface your ATARI 400 or 800 computer to a printer using a standard parallel interface. You may wish to add improvements to the program, such as making it invulnerable to [SYSTEM RESET], or storing it as your AUTORUN.SYS program, so that the system will "come up" with the printer routines loaded. Finally, the program demonstrates the flexibility that was built into the ATARI computer which allows it to do things the designers may never have thought of.

```
200 REM PRINTER HANDLER ROUTINE *****
210 REM ALAN MACY    MAY 1, 1983 *****
220 REM ******************************
230 DATA 85,6,140,6,143,6,11
240 DATA 6,143,6,143,6,141,151
250 DATA 6,201,155,208,30,169,13
260 DATA 32,12,6,169,10,141,151
270 DATA 6,238,152,6,169,56,205
280 DATA 152,6,16,10,169,12,141
290 DATA 151,6,169,0,141,152,6
300 DATA 169,4,45,1,211,208,249
310 DATA 173,151,6,141,0,211,169
320 DATA 254,45,1,211,141,1,211
330 DATA 162,16,202,16,253,169,1
340 DATA 13,1,211,141,1,211,160
350 DATA 1,96,169,251,45,2,211
360 DATA 141,2,211,169,255,141,0
370 DATA 211,169,4,13,2,211,141
380 DATA 2,211,169,251,45,3,211
390 DATA 141,3,211,169,9,141,1
400 DATA 211,169,4,13,3,211,141
410 DATA 3,211,169,9,141,1,211
420 DATA 169,0,141,152,6,160,1
430 DATA 96,160,1,96,96,169,10
440 DATA 32,12,6,0,0,0,0
450 FOR I=1536 TO 1688
460 READ NUM
470 POKE I,NUM
480 NEXT I
490 IF PEEK(794)<>ASC("P")THEN PRINT
"PRINTER ID NOT IN EXPECTED LOCATION"
500 POKE 795,0:POKE 796,6:REM LOCATION
 OF NEW VECTOR TABLE
510 PRINT "PRINTER ROUTINES LOADED"
520 END
```

TYPO TABLE

Variablechecksum = 65356

Linenum	range	Code	Length
200-	310	FQ	354
320-	430	UV	333
440-	520	HM	237

continued on next page

```
0220 ; *** SOFTWARE PRINTER INTERFACE **
0230 ; *** ALAN MACY      MAY 21, 1983 **
0240 ; ***                            **
0250 ; *** THESE ROUTINES ALLOW A      **
0260 ; *** DIRECT CONNECTION TO A      **
0270 ; *** PRINTER VIA JOYSTICK PORTS **
0280 ; *** 1, 2, AND 3.               **
0310 ;
0320  *=$600          ; PAGE 6 FREE AREA
0330  .OPT NOEJECT
0340  .TITLE "PRINTER INTERFACE  MACY
      MAY 21, 1983"
0350 ;
0360 ;  EQUATE TABLE ***************************
0370 ;
0380 PORTA=$D300      ;FOR PORTS 1&2
0390 PORTB=$D301      ;FOR PORTS 3&4
0400 PACTL=$D302      ;CONTROL, PORTA
0410 PBCTL=$D303      ;CONTROL, PORTB
0420 ATCR=155         ;ATASCII CARRIAGE RETURN
0430 CR=13            ;ASCII CARRIAGE RETURN
0440 LF=10            ;LINE FEED
0450 FF=12            ;FORM FEED
0460 LPPG=56          ;LINES/PAGE
0470 ;
0480 ; DEVICE HANDLER VECTOR TABLE **********
0490 ;
0500  .WORD POPEN-1   ;OPEN PRINTER
0510  .WORD PCLOS-1   ;CLOSE PRINTER
0520  .WORD NOGOT-1   ;GETBYTE
0530  .WORD CHOUT-1   ;PUTBYTE
0540  .WORD NOGOT-1   ;GETSTAT
0550  .WORD NOGOT-1
0560 ;
0570 ; SINGLE CHARACTER OUTPUT ROUTINE *****
0580 ; CHARACTER IN ACCUMULATOR
0590 ;
0600 CHOUT STA ASAVE
0610  CMP #ATCR       ;ATASCII RETURN
0620  BNE SEND        ;CHAR=ATAS RETURN?
0630  LDA #CR         ;YES, REPLACE WIT
0640 ;                A "REAL ASCII CR"
0650  JSR CHOUT       ;USE RECURSION TO
0660 ;                OUTPUT CR THEN LF
0670  LDA #LF         ;A LINEFEED
0680  STA ASAVE
0690  INC LINNUM      ;INCREMENT PAGE LINE
      NUMBER
0700  LDA #LPPG       ;COMPARE WITH
0710  CMP LINNUM      ;LINES/PAGE
0720  BPL SEND        ;IF NOT TO END OF PAGE
0730 ;                AT PAGE END
0740  LDA #FF         ;A FORM FEED
0750  STA ASAVE
0760  LDA #ØØ         ;RESET LINE NUMBER
0770  STA LINNUM
0780 SEND LDA # 4     ; CHK BIT 2 TO SEE IF
      BUSY
0790  AND PORTB
0800  BNE SEND        ;PRINTER BUSY?
0810  LDA ASAVE       ;NO, GET THE CHAR
0820  STA PORTA       ;STORE CHAR IN PORT
0830  LDA #$FE        ;1111111Ø
0840  AND PORTB
0850  STA PORTB       ;STROBE LOW
0860 ;                MUST HOLD STROBE LOW
0870 ;                FOR A BIT TO BE SURE
0880 ;                PRINTER GOT THE MESSAGE
0890  LDX #$1Ø        ;DELAY  COUNTER
0900 XLOOP DEX        ;COUNT DOWN
0910  BPL XLOOP       ;CONTINUE UNTIL <=Ø
0920  LDA #$Ø1        ; ØØØØØØØ1
0930  ORA PORTB
0940  STA PORTB       ;STROBE HIGH AGAIN
0950 ;
0960 ; THE STROBE HAS NOW BEEN PULSED
0970 ; TELLING THE PRINTER THAT A CHAR
0980 ; MAY BE TAKEN
0990  LDY #Ø1         ;SET STATUS=ALL OK
1000  RTS
1010 ;
1020 ; ROUTINE TO OPEN PRINTER ****************
1030 ; INVOLVES RECONFIGURING PORTS
1040 ;
1050 POPEN LDA #$FB   ;FIRST PORTA
1060  AND PACTL       ;CLEAR BIT 2
1070  STA PACTL
1080  LDA #$FF        ;SET FOR ALL OUTPUT
1090  STA PORTA
1100  LDA #$Ø4        ;SET BIT 2
1110  ORA PACTL
1120  STA PACTL
1130  LDA #$FB        ;NOW DO PORTB
1140  AND PBCTL
1150  STA PBCTL
1160  LDA #$Ø9        ;BITS Ø AND 3 OUT
1170  STA PORTB       ;BITS 1&2 INPUT
1180  LDA #$Ø4
1190  ORA PBCTL
1200  STA PBCTL
1210  LDA #$Ø9
1220  STA PORTB       ;MAKE SURE THAT
1230 ;                INPUT PRIME AND STROBE
1240 ;                ARE HIGH TO START WITH
1250  LDA #ØØ         ;SET LINE NUMBER
1260  STA LINNUM      ;TO ZERO
1270  LDY #Ø1         ;STATUS=ALL OK
1280  RTS
1290 ;
1300 PCLOS LDY #Ø1    ;COME HERE FOR CLOSE
1310 ;                SET STATUS=ALL OK
1320  RTS
1330 ;
1340 NOGOT RTS        ;COME HERE WHEN DON'T
     HAVE THE ROUTINE
1350 ;
1360  LDA #LF         ;USE THIS FOR TESTING
1370  JSR CHOUT       ;IT OUPUTS A LF
1380  BRK
1390 ;
1400 ; STORAGE LOCATIONS **********************
1410 ;
1420 ASAVE .BYTE Ø
1430 LINNUM .BYTE Ø
```



WHEN EAGLES FIRST RULED THE SKIES...
EAGLES™ flies you over France during World War I to join the men who first rose to the skies like some glorious birds of prey. This realistic strategy simulation gives you fourteen historic planes — including the feared Fokker DR-1 Triplane (the Red Baron's favorite) and the legendary Sopwith Camel — each accurately rated for speed, rate of climb and maneuverability. If you like, you can even fly planes of your own design. You can play solitaire against enemy planes flown by the computer, or against other players. Fly balloon-busting missions, set up duels between single aircraft, or create grand dogfights involving as many as twenty planes. Choose historic scenarios, or let the computer set up the battles.
So head on down to your nearest computer/software or game dealer and get your wings today!
FOR APPLE,® ATARI® & COMMODORE 64®
On 48K mini floppy disk for Apple® II with Applesoft ROM Card, II+, IIe & Apple III. On 40K disk for Atari® 400/800/1200 with BASIC cartridge. On 64K disk for the Commodore 64® $39.95.
SSI
STRATEGIC SIMULATIONS INC
If there are no convenient stores near you, VISA & Mastercard holders can order direct by calling 800-227-1617, ext. 335 (toll free). In California, call 800-772-3545, ext. 335. To order by mail, send your check to: Strategic Simulations Inc, 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 6.5% sales tax.) Please specify computer format.
WRITE FOR A FREE COLOR CATALOG OF ALL OUR GAMES.
APPLE, ATARI and COMMODORE 64 are the registered trademarks of Apple Computer, Inc., Atari, Inc., and Commodore Electronics, Ltd., respectively.



WORD PROCESSING THE DECISION IS EASY!!!

Datasoft eliminates the frustrations of choosing a word processor. When it comes to ease of use, versatility, and price, Datasoft beats the competition hands down, and now both Text Wizard™ and Spell Wizard™ have been combined into a specially marked package to save you $20.00.

Text Wizard, one of few programs to receive four (4) excellents on the Infoworld Report Card Review, let's you create letters, documents, reports and much, much more. It's as simple as a few keystrokes to edit, erase, move lines or paragraphs.

With Spell Wizard and its 33,000 + Word Dictionary, you can eliminate embarrassing typos or spelling errors.

InfoWorld
Software Report Card
Text Wizard

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	☑
Documentation	☐	☐	☐	☑
Ease of Use	☐	☐	☐	☑
Error Handling	☐	☐	☐	☑

Text Wizard
Atari 400/800 (32K min.)

Spell Wizard
Atari 400/800/1200 (32K min.)

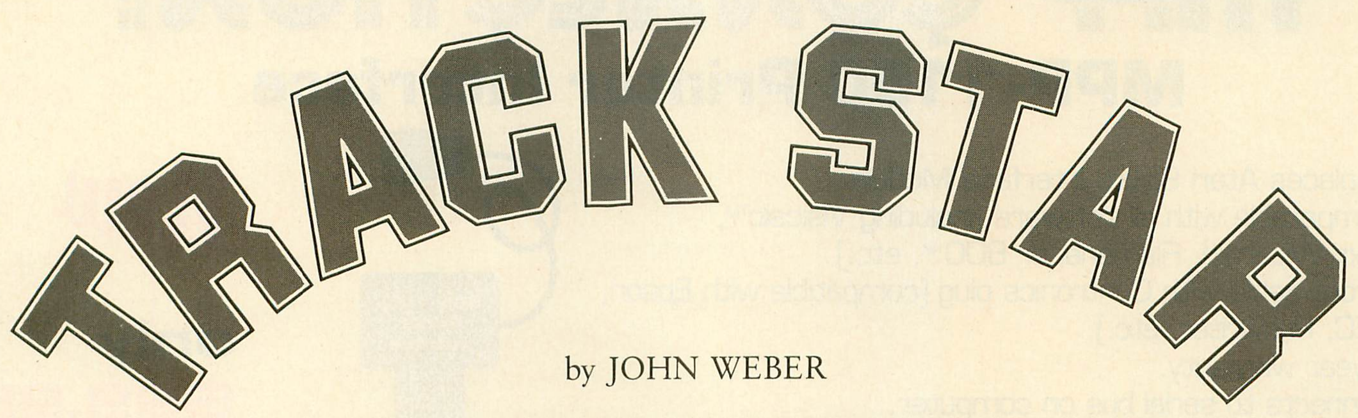
Spell Wizard automatically indicates errors, and allows you to immediately view your dictionary for easy correction. You can also create or add unique words to your own custom dictionary.

You might expect to pay $79.00 to $99.00 for only one of these programs, however, Text Wizard normally $49.95 and Spell Wizard normally $49.95 suggested retail, can both be purchased for a limited time in specially marked packages for only $79.95 total price, a savings of $20.00.

Check with your local dealer or send check or money order with $3.00 postage and handling (California residents add 6½% sales tax) to:

DATASOFT, INC.
9421 Winnetka Avenue, Chatsworth, CA 91311 (213) 701-5161

Datasoft®



TRACK STAR

by JOHN WEBER

Indoor athletes may think it easy to become a track star, but I challenge them to complete three laps of this cross-country course. You guide your runner with the joystick, dodging rocks, trees and potholes as you race from upper left to bottom right and back again. When you get good at this you can add in the hurdles for extra points, and you'll need them to get the highest rating — Track Star!

Your first task is to touch the flag at the lower right, then get the flag that appears at upper left; this marks one lap. Trees and rocks impede your way, but potholes are almost lethal — hitting one puts you back to the start of the lap, and hitting two of them disqualifies you. Beware of shortcuts; though they are possible, your score is decreased if you use them.

Each successive lap is more difficult. Your running speed increases, and more potholes are placed in the course. Hitting a pothole puts your runner back at the start of the lap you are on, and the timer keeps ticking all the while.

At the end of the run, you will receive one of five ratings according to your track abilities. To get the highest rating, not only do you have to be fast and agile, but you also have to accumulate points by jumping the hurdles. There are six of them located at the bottom half of the track. You can jump over them while running either left or right. Simply hold the joystick left or right and press the fire button. Only one hurdle at a time can be jumped, but you should be able to jump all three in the same row without falling down. Five points are awarded for each successful jump. Once a hurdle has been jumped you will not receive extra points by jumping it again while you are in the same lap.

Since there are six hurdles and three laps to cover, a total of 90 points is possible. The track can be run in any pattern, but as in any race, if you cheat and take a shortcut through the trees, you will be penalized by losing all your points. You will know this has happened when you hear two low tones. If you take a break during the race, or otherwise exceed the five minute time limit, the race automatically ends.

A time of less than 110 seconds, plus at least 80 points (16 hurdles), without falling into a pothole earns you the status of Track Star.

So put on your running shoes, take a few deep breaths, and don't look back.

Requires 16K RAM

```
10 REM *****************************
20 REM *        TRACK STAR         *
30 REM *           6/23            *
40 REM *     BY JOHN WEBER         *
45 REM *    ANTIC MAGAZINE         *
50 REM *****************************
60 GOSUB 2000:GOSUB 1000
70 POKE POS,WW
80 IF STICK(0)=15 THEN 80
90 POKE 20,0:POKE 19,0
100 REM ** MAIN LOOP **
105 LST=STICK(0):WW=1
110 IF LST>8 AND LST<12 THEN WW=2
115 IF LST=13 OR LST=14 THEN WW=3
120 POKE POS,WW
125 TIME=PEEK(20)+256*PEEK(19):POSITIO
N 12,23:? #6;INT(TIME/60)
126 IF INT(TIME/60)>300 THEN POP:GOTO
1000
130 NPOS=POS+20*(LST=9 OR LST=5 OR LST
=13)-20*(LST=6 OR LST=10 OR LST=14)-(L
ST>8 AND LST<12)+(LST>4 AND LST<8)
135 IF NPOS<SC OR NPOS>SC+459 THEN 105
138 IF PEEK(NPOS+20)=137 AND PEEK(NPOS
-20)=137 THEN SOUND 0,255,10,10:SCORE=
0
```

continued on page 61

TRACK STAR *continued from page 59*

```
140 IF STRIG(0)=0 AND STICK(0)<13 THEN
 GOSUB 200:GOTO 120
145 IF PEEK(NPOS)=135 THEN GOSUB 700:G
OTO 105
150 IF PEEK(NPOS)=10 THEN GOSUB 800:GO
TO 105
155 IF PEEK(NPOS)<>0 THEN GOSUB 500:GO
TO 105
160 POKE POS,0:POS=NPOS:POKE POS,WW:FO
R X=1 TO FAST:NEXT X
165 POKE S1,138:FOR A=125 TO 121 STEP
-2:POKE S0,A:NEXT A:POKE S1,0:POKE S0,
0
175 IF STICK(0)=15 OR STICK(0)=LST THE
N 125
180 GOTO 105
200 REM *** RIGHT HURDLE JUMP    ***
205 IF STICK(0)>8 AND STICK(0)<12 THEN
 300:REM GO TO LEFT HURDLE
210 RJMP=19:FOR I=0 TO 2
215 IF PEEK(POS-RJMP)<>0 THEN 260
220 IF PEEK(POS-RJMP+20)=196 THEN JUMP
=1:POKE (POS-RJMP+20),4+128
225 POKE POS,0:POKE POS-RJMP,WW
230 DV=170:HI=94:LO=78:TONE=-2:GOSUB 4
50
240 POKE POS-RJMP,0:RJMP=RJMP-1:NEXT I
:POS=POS+3
245 IF PEEK(POS)<>0 THEN POS=POS-1:JUM
P=0:GOTO 245
250 IF JUMP=1 THEN DIR=-3:GOSUB 400:JU
MP=0
255 RETURN
260 FOR X=1 TO I:POKE POS,0:POS=POS-1
262 IF PEEK(POS)<>0 THEN POS=POS+1
265 POKE POS,5
270 DV=138:HI=125:LO=75:TONE=-2:GOSUB
450:NEXT X
275 FOR X=1 TO 300:NEXT X:RETURN
300 REM *** LEFT JUMP ***
305 LJMP=21:FOR I=0 TO 2
310 IF PEEK(POS-LJMP)<>0 THEN 360
315 IF PEEK(POS-LJMP+20)=196 THEN JUMP
=1:POKE POS-LJMP+20,4+128
320 POKE POS,0:POKE POS-LJMP,WW
325 DV=170:HI=94:LO=78:TONE=-2:GOSUB 4
50
330 POKE POS-LJMP,0:LJMP=LJMP+1:NEXT I
:POS=POS-3
335 IF PEEK(POS)<>0 THEN POS=POS+1:JUM
P=0:GOTO 335
340 IF JUMP=1 THEN DIR=3:GOSUB 400:JUM
P=0
345 RETURN
360 IF POS+1>SC+455 THEN POP :GOTO 385
365 FOR X=1 TO I
370 POKE POS,0:POS=POS+1:IF PEEK(POS)<
>0 THEN POS=POS+1:GOTO 380
375 POKE POS,5
380 DV=138:HI=125:LO=75:TONE=-2:GOSUB
450
385 POKE POS,5:FOR X=1 TO 300:NEXT X:R
ETURN
400 REM **** JUMPING TOTALS ****
410 POKE POS+DIR,21
420 FOR X=1 TO 75:NEXT X:POKE POS+DIR,
0:SCORE=SCORE+5
430 RETURN
450 REM *** COMMON SOUND ROUTINE **
460 POKE S1,DV:FOR A=HI TO LO STEP TON
E:POKE S0,A:NEXT A
470 POKE S1,0:POKE S0,0:RETURN
500 REM *** CRASH    ***
510 POKE POS,5
515 FOR X=1 TO 2
520 DV=138:HI=125:LO=75:TONE=-2:GOSUB
450
530 IF POS+20>SC+459 THEN POP :GOTO 55
0
540 IF PEEK(POS+20)=0 THEN POKE POS,0:
POS=POS+20:POKE POS,5
545 NEXT X
550 IF STICK(0)=15 THEN 550
560 RETURN
600 REM *** INCREASE POTHOLES ***
610 X=0:FOR I=1 TO 3
620 READ A:IF A=-1 THEN X=255:GOTO 620
625 IF A=-2 THEN RETURN
630 POKE SC+X+A,135:NEXT I:RETURN
650 DATA 54,247,66,92,144,197,82,170,-
1,7,-1,94,82,126,-2,-2,-2
700 REM *** FALL IN A POTHOLE ***
710 POKE POS,0:FALL=FALL+1
720 DV=170:HI=25:LO=250:TONE=4:GOSUB 4
50
730 IF FALL=2 THEN POP :GOTO 1000
740 WW=1:POKE SC+40,0:POKE SC+437,10
750 POS=SC+61:POKE POS,WW
760 IF STICK(0)=15 THEN 760
770 RETURN
800 REM *** TOUCH FLAGS ***
805 IF NPOS=SC+40 THEN 850
810 POKE POS,0:POS=NPOS:POKE POS,WW
820 DV=168:HI=20:LOW=120:TONE=20:GOSUB
 450
830 IF LAP=2 THEN GOSUB 600:GOSUB 600
840 BOT=1:POKE SC+40,10:RETURN
850 IF BOT=0 THEN RETURN
860 LAP=LAP+1:IF LAP=3 THEN POP :GOTO
1000
870 POKE POS,0:POS=NPOS:POKE POS,WW
875 DV=168:HI=20:LOW=120:TONE=20:GOSUB
 450
880 GOSUB 600:FAST=FAST-11:POKE 77,0
885 BOT=0:POKE SC+437,10
890 FOR I=SC+303 TO SC+311 STEP 4:POKE
 I,196:NEXT I:FOR I=SC+425 TO SC+433 S
TEP 4:POKE I,196:NEXT I
895 RETURN
```

continued on next page

```
900 REM *** GET RATING ***
905 TIM=INT(TIME)/60:RATE=3
915 IF FALL=2 OR TIM>140 THEN RATE=5:G
OTO 950
920 IF FALL=1 OR TIM>125 THEN RATE=4:G
OTO 950
925 IF SCORE>54 AND TIM<130 THEN RATE=
2
930 IF SCORE>79 AND FALL=0 AND TIM<110
 THEN RATE=1
950 RESTORE 980:FOR I=1 TO RATE:READ R
$:NEXT I:RETURN
980 DATA TRACK STAR,CLOSE SECOND,STEAD
Y PACE,LEAD FOOT,TWO LEFT FEET
1000 REM *** TITLE PAGE ***
1005 GRAPHICS 17:POKE 756,BEGIN/256
1010 POSITION 4,3:? #6;"TRACK STAR":IF
 TIME=0 THEN 1030
1015 POSITION 3,7:? #6;"TOTAL LAPS = "
;LAP:POSITION 9,9:? #6;"TIME = ";INT(T
IME/60)
1020 POSITION 8,11:? #6;"SCORE = ";SCO
RE
1022 GOSUB 900
1024 POSITION 3,13:? #6;"RATING:":POSI
TION 5,16:? #6;R$
1030 POSITION 2,23:? #6;"HIT START TO
RUN"
1035 FOR X=0 TO 19:POSITION X,19:? #6;
CHR$(1)
1040 FOR I=1 TO 15:IF PEEK(53279)=6 TH
EN POP :GOTO 1090
1043 NEXT I:SOUND 0,100,8,8:SOUND 0,0,
0,0
1045 POSITION X,19:? #6;" ":NEXT X
1050 FOR X=19 TO 0 STEP -1:POSITION X,
19:? #6;CHR$(2)
1055 FOR I=1 TO 15:IF PEEK(53279)=6 TH
EN POP :GOTO 1090
1060 NEXT I:SOUND 0,100,8,8:SOUND 0,0,
0,0
1065 POSITION X,19:? #6;" ":NEXT X
1070 GOTO 1035
1090 IF POS=SC+61 THEN 1099
1095 GOSUB 2070:GOTO 70
1099 GOSUB 2070:RETURN
2000 REM *** REDEFINE CHARS AND SETUP
2005 DIM CH$(32),R$(13):RESTORE 2015
2010 FOR I=1 TO 32:READ A:CH$(I)=CHR$(
A):NEXT I
2015 DATA 104,104,133,204,104,133,203,
104,133,206,104,133,205,162,4,160,0
2020 DATA 177,203,145,205,136,208,249,
230,204,230,206,202,208,240,96
2025 POKE 106,PEEK(106)-5:GRAPHICS 0:B
EGIN=(PEEK(106)+1)*256:POKE 756,BEGIN/
256
2030 A=USR(ADR(CH$),57344,BEGIN)
2040 RESTORE 2045:FOR I=BEGIN+8 TO BEG
IN+87:READ A:POKE I,A:NEXT I:RETURN
2045 DATA 3,3,6,6,7,6,14,17
2047 DATA 192,192,96,96,224,96,112,136
2049 DATA 32,36,36,24,24,36,36,4
2051 DATA 1,3,5,9,16,16,16,16
2053 DATA 8,136,126,29,28,20,35,64
2055 DATA 66,255,66,255,66,255,66,255
2057 DATA 62,63,255,248,126,154,240,63
2059 DATA 60,120,254,248,254,62,31,255
2061 DATA 16,56,56,124,124,254,16,16
2063 DATA 8,24,56,120,8,8,8,8
2070 GRAPHICS 17:POKE 756,BEGIN/256:RE
STORE 2075:FOR X=0 TO 4:READ A:POKE 70
8+X,A:NEXT X
2075 DATA 252,8,194,156,22
2080 POKE 559,0:SC=PEEK(88)+256*PEEK(8
9)
2085 SCORE=0:LAP=0:FAST=28:JUMP=0:WW=1
:FALL=0:BOT=0:POS=SC+61:S0=53760:S1=53
761
3000 REM *** DRAW SCREEN ***
3010 RESTORE 3050:X=0
3020 READ A:IF A=-1 THEN X=255
3030 IF A=-2 THEN 4000
3040 POKE SC+X+A,72:GOTO 3020
3049 REM TYPE DATA NUMBERS CAREFULLY
3050 DATA 0,1,2,3,4,5,6,17,18,19,27,28
,38,39,48,49,50,59,80,81,95,96,102,103
,104,105,106,114,126
3060 DATA 127,128,129,130,131,132,133
,134,182,183,184,185,186,188,189,202,20
3,209,210,211
3070 DATA 222,231,232,233,251,254,255,
-1,1,2,17,19,23,40,41,90,109,110,111,1
16,117,132,134,135,138,139
3080 DATA 165,184,185,186,203,204,205,
206,207,222,223,224,-2
4000 FOR I=SC+9 TO SC+16:POKE I,137:NE
XT I:FOR I=SC+120 TO SC+400 STEP 40:PO
KE I,137:NEXT I
4010 FOR I=SC+79 TO SC+439 STEP 40:POK
E I,137:NEXT I:RESTORE 4040:X=0
4020 READ A:IF A=-1 THEN X=255:GOTO 40
20
4025 IF A=-2 THEN 4050
4030 POKE SC+X+A,137:GOTO 4020
4040 DATA 186,188,207,214,225,-1,88,11
3,209,220,-2
4050 POKE SC+437,10
4060 FOR I=SC+303 TO SC+311 STEP 4:POK
E I,196:NEXT I:FOR I=SC+425 TO SC+433
STEP 4:POKE I,196:NEXT I
4070 POKE SC+92,135:POKE SC+355,135:PO
KE SC+156,135
4080 POSITION 6,23:? #6;"TIME: "
4099 RESTORE 650:POKE 559,46:RETURN
```

continued on page 64



Start off on the right foot
with an ATR8000 for your Atari.
In the long run, it makes more sense.



You're going to expand your Atari®... So why not do it right.

Your first step, purchase of an Atari 400 or 800, was smart. Your next logical step is to buy a SWP ATR8000™ interface unit.

An ATR8000 gives you more capability for less money. You can start small, but you can build big . . . from an outstanding home computer to a powerful CP/M™ machine. And prices for the ATR8000 start at only $349.95.

Yes . . . I'd like to know more about SWP's ATR8000 and CO-POWER-88 for my Atari 400/800 computer. Please rush me free literature.

Send to:
SWP Microcomputer Products, Inc.
2500 E. Randol Mill Rd. - 125
Arlington, Texas 76011
100

name ______________________

street address ______________________

city ________ state ________ zip ________

MAIL TODAY!

DEALER INQUIRIES INVITED.



2500 E. Randol Mill Rd
Arlington, Texas 76011
817/469-1181

We used to be Software Publishers, Inc.

ATR8000 and CO-POWER-88 are trademarks of SWP Microcomputer Products, Inc.; CP/M and CP/M-86 are trademarks of Digital Research Corporation; MSDOS is a trademark of Microsoft Corporation; Z-80 is a trademark of Zilog Corporation; Atari 400, Atari 800 and Atari 810 are trademarks of Atari, Inc.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

What you get first, in the amazingly adaptable ATR8000, is plug-together interfacing to all ordinary system devices:

- To floppy disk drives — The ATR8000 lets you hook up from one to four low-cost add-on drives, 5" or 8", one- or two-sided, in any mix ...and go right to work with either a single- or double-density DOS. (DOS is optional.)
- To a printer — The ATR8000 parallel "Centronics-interface" is supported by a ROM driver program that you can access from Atari Basic.
- To a modem, to a serial data terminal or to any other RS-232 communicating device — The comprehensive users manual includes an Atari Basic serial printer driver.
- To Atari peripherals such as the 810 Disk Drive.

And of course the ATR8000 interfaces to the 400 or 800 computer itself.

But system versatility is just the beginning; the ATR8000 also opens the door to another world of microcomputing.

Atari®-CP/M™ — A whole new world of personal computing

Quite simply, CP/M is the dominant operating system of the 8-bit microworld. Make the ATR8000 your first system expansion unit, and you can put the CP/M world in your own little jug.

Since the ATR8000 is actually a self-contained Z-80 computer, a low-cost upgrade converts your Atari-ATR8000 system into a full-capability CP/M machine. Of course you can also start right off with a CP/M-ATR8000. In either case, you get CP/M program-development capability, plus access to an enormous base of proven application programs that just load and go. The CP/M upgrade, which includes 64 Kbytes of RAM, costs just $249.95.

And it doesn't end there!

You can further upgrade your CP/M-ATR8000 to 16-bit microprocessing power . . . to CP/M-86 or MSDOS operation. Moreover, with SWP's CO-POWER-88™ upgrade, you not only retain your 8-bit processing capability, but you also can use CO-POWER-88 RAM — up to 256 Kbytes — as fast, simulated disk storage for CP/M operation.

Like the ATR8000, CO-POWER-88 comes with comprehensive documentation. Prices begin at $749.95 with 128 Kbytes of RAM and CP/M-86 operating system.

TRACK STAR *continued from page 62*

TYPO TABLE

Variable checksum = 807868

Line num	range	Code	Length
10-	105	QV	358
110-	140	CH	519
145-	220	KD	534
225-	300	QB	453
305-	370	VJ	499
375-	510	JQ	355
515-	630	BI	385
650-	810	PO	402
820-	900	YW	491
905-	1015	TF	537
1020-	1055	AQ	528
1060-	2025	RR	528
2030-	2063	RA	377
2070-	3050	RM	547
3060-	4040	ZA	544
4050-	4099	VW	260

THE PROGRAM

60-90	Control initialization.
100-180	Main loop.
105-120	Determine which direction to face runner.
125	Up the clock.
130-160	Calculate new position and test for collisions.
165-180	Running sound, go to top of loop.
200-299	Right hurdle jump routine.
215-225	Test for collision or safe jump.
240	If safe jump, continue jump.
260-275	Unsuccessful right jump routine; crash and bounce
300-399	Left hurdle jump routine.
310-325	Test for collision or safe jump.
330	If safe jump, continue jump.
360-385	Any bad jump routine; crash and bounce.
400-430	Displays points received on screen after a good jump.
460-470	Common sound routine.
500-560	Any collision during the run (except during jumping) bounces you back a little.
600-650	Increase potholes after each lap.
700-770	Fall into a pothole routine. Position runner back to start. Add to fall counter. Reset position of flags.
800-849	Hit bottom flag.
850-895	Hit top flag routine. Increase speed of runner, reset all hurdles that have been jumped so points can be gotten again.
900-980	Find rating for run.
1000-1099	Title page and ending stats page.
2000-2063	Download char. set and redefine new chars.
2070-2085	Set graphics mode, initialize variables.
3000-3080	Position rocks on the screen.
4000-40	Position trees, potholes, flag on screen.

LIST OF PROGRAM VARIABLES

SCORE	— points accumulated by jumping hurdles
LAP	— number of lap being run
FAST	— speed control uses a FOR/NEXT loop during laps
JUMP	— determine if you jumped a hurdle
WW	— which way, i.e., which direction you are running
FALL	— counts number of times fallen in pothole
BOT	— switch set indicating if bottom flag has been hit
S0	— equate with location 53760, a sound register
S1	— equate with location 53761, a sound register
DV	— distortion/volume used to set a sound reg.
HI	— used to control sound
LO	— used to control sound
TONE	— used to control sound

PEEK VALUES OF REDEFINED CHARACTERS

right runner	1
left runner	2
up&down runner	3
fallen runner	5
hurdles	4 + 192
potholes	7 + 128
rocks	8 + 64
trees	9 + 128
flags	10



A million laughs

SPARE CHANGE™ You are the game-happy owner of the Spare Change Arcade. Two fun-loving, but overworked Zerks—the main characters in your most popular game—have broken loose and are trying to retire from the business. You try madly to stop them. If you can get a coin into the juke box, the Zerks get so caught up in the music, they drop everything and start dancing. You also try popping popcorn and making a pay phone ring—which immediately makes the Zerks stop, answer and start a wild conversation. If you "win" the game, there are rib tickling cartoons by the Zerks to reward your efforts. It's a game full of sight gags, surprises and comedy. From the best. Brøderbund! **For the Apple® II, II+ and IIe. Coming soon for the Atari® home computers in disk format.**



and an endless challenge

LODE RUNNER™ Here's a game that will never stop challenging you. That's because Lode Runner is more than a spellbinding, fast-action game with its 150 different mind-boggling game screens. Lode Runner is also an easy-to-use Game Generator that lets you create your own games. Without any knowledge of programming, you can easily design unique Lode Runnner screens, then bring them to action-packed life. You will maneuver through scene after scene, running, jumping, drilling passages and outfoxing enemy guards in a secret underground hide-away as you pick up chests of gold stolen from citizens of the Bungeling Empire. There's no end to the thrills, chills and challenge. Of course, it's from Brøderbund! **For the Apple II, II+ and IIe. Coming soon for the: Atari home computers (disk and cartridge); Atari 5200™ Super System; Commodore 64™; VIC-20™; IBM® PC.**

Ask your Brøderbund dealer for sneak previews.

Brøderbund Software **Discover the Difference**

17 Paul Drive San Rafael, CA 94903

Craftsmen Need Precision Tools . . .
Programmers! Demand Precision Software!

BASIC XL has twice the speed and twice the power of Atari® BASIC. And yet, as befits a fine craftsman's tool, BASIC XL is even easier to use and more dependable, while including such outstanding major additions as structured programming, string arrays, programming aids, enhanced graphics, and business capabilities.

Atari BASIC is a good starting point. We should know. We wrote it in 1978. Buy BASIC XL. Take advantage of five more years of experience!

So, prepare yourself for some exploration into imaginative programming with BASIC XL! Cartridge, excellent tutorial, reference manual . . . $99.

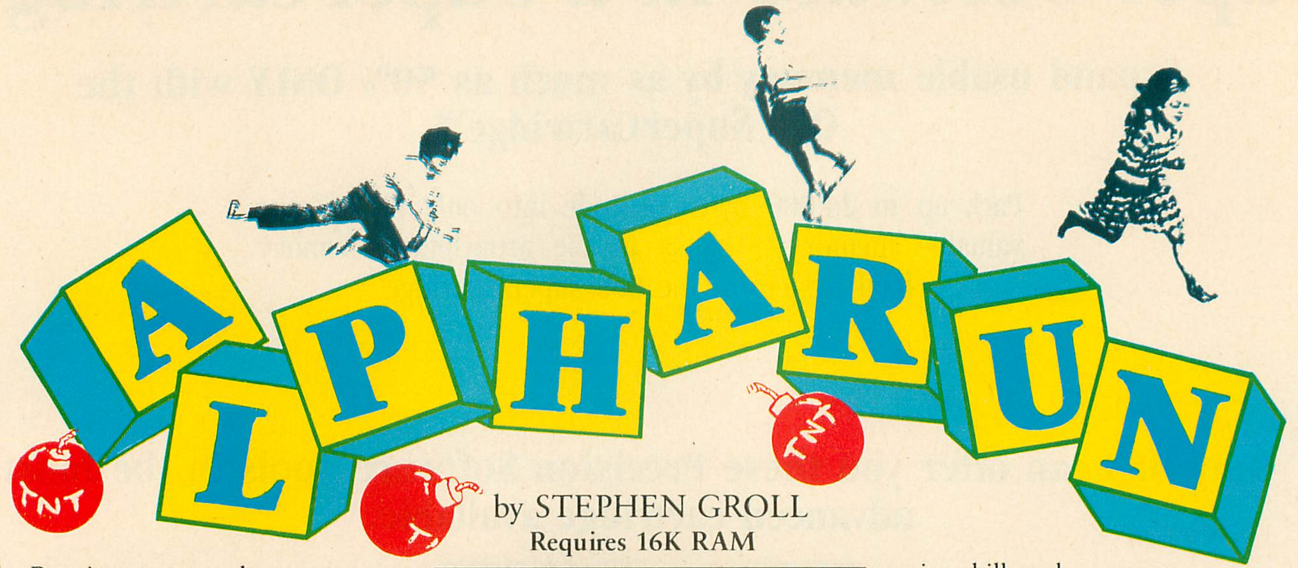
Functional, honest, and beautiful describe the simple lines of a craftsman's tools. For the jeweler these tools are an extension of the human hand to better execute complex designs. For you, the programmer, Precision Software tools keep complications out of your programming while allowing you to produce intricate programs.

See the complete collection of OSS Precision Software™ tools!

- MAC/65: The fastest 6502 macro assembler/editor package on cartridge . . . $99.
- BUG/65: A powerful debugger. On disk, with OS/A+ . . . $35.
- C/65: The first native mode "small c" compiler for Atari and Apple® computers. On disk . . . $80.
- ACTION!: The fastest, small computer language ever. A feature-packed cartridge at only . . . $99.



OSS™
Precision Software Tools
1173D S. Saratoga/Sunnyvale Road
San Jose, CA 95129 • (408) 446-3099



ALPHA RUN

by STEPHEN GROLL

Requires 16K RAM

Alpha Run is a race, or chase, run over letters or numbers in sequence without exploding the bombs that also lie in the way. A simple game, it teaches the alphabet order and the number sequence 1 through 9. The little blue race car is controlled by a joystick in Port One. When the car runs over a number or a letter in proper sequence, the number or letter disappears. If the car runs over a bomb, hits a wall, or touches a number out of sequence, everything explodes and the game starts over. If the sequence is completed, the bombs are rendered harmless. Run over them to end the game. Your score equals the time elapsed during the run.

There are two games possible — the alphabet run that uses the capital letters A-Z, and the number run with the numerals 1 through 9. Each game has two versions, a timed version and a countdown version. The timed version is open-ended, and most suitable for beginners and young players. The score is simply based on time, no matter how long it takes. Players of unequal ability can be handicapped. The countdown version sets a running time limit that decreases as the player gains skill at the contest.

One way to increase speed is to "jump" over unwanted letters or bombs by pressing the firebutton while moving the stick. Only one such obstacle can be jumped at a time, however.

In the countdown version the object is to run down the numbers or letters and explode the bombs one at a time before the set time expires. Each round gives less time to accomplish the objective, but you will never have less than nine time units for numbers or 35 for letters. Each successful round of numbers will give you ten points plus one point for each unused time unit.

A successful round of letters scores 30 points plus one point for each time unit left. Needless to say, if the time runs out before you accomplish your mission the bombs will be set off and the game will end.

Alpha Run is a great game for children in that it can help teach them numbers and the alphabet. At the same time it will help develop hand-eye coordination. Adults will enjoy it because it is a challenge.

```
1 REM ** ALPHA RUN ** ANTIC MAGAZINE *
*
5 X=0:Y=5:TRAP 6000
10 POKE 106,PEEK(106)-5:GRAPHICS 18
15 POSITION 2,5:? #6;"please stand by.
"
20 STLL=(PEEK(106)+1)*256
30 FOR MM=0 TO 1023:POKE STLL+MM,PEEK(
57344+MM):NEXT MM
50 OCHR=8:GOSUB 130:OCHR=24:GOSUB 130:
OCHR=32:GOSUB 130:OCHR=40:GOSUB 130:OC
HR=256:GOSUB 130:OCHR=480:GOSUB 130
60 OCHR=80:GOSUB 130:GOTO 135
130 FOR MM=0 TO 7:READ V:POKE OCHR+STL
L+MM,V:NEXT MM:RETURN
135 GOSUB 9250
140 HPTS=0:BTIM=90000
145 GRAPHICS 17:POSITION 3,2:? #6;"PUS
H JOYSTICK":POSITION 4,5:? #6;"FORWARD
 FOR":POSITION 4,8:? #6;"number  run"
147 POSITION 9,11:? #6;"or"
150 POSITION 3,14:? #6;"PULL JOYSTICK"
:POSITION 5,17:? #6;"BACK FOR":POSITIO
N 3,20:? #6;"alphabet  run"
152 IF STICK(0)<>15 THEN 152
155 IF STICK(0)=14 THEN LGNU=26:NU=17:
LL=9:LTIM=20:GOTO 170
160 IF STICK(0)=13 THEN LGNU=123:NU=97
:LL=26:LTIM=70:GOTO 170
```

Stephen Groll is a parent and a clergyman, self-taught as a programmer. His game Microids *appeared in ANTIC, May '83. This clever little educational game shows what can be done with simple techniques and an ATARI.*

```
165 GOTO 155
170 POSITION 4,8:? #6;" TIME RUN  "
175 POSITION 9,11:? #6;"or"
180 POSITION 3,20:? #6;" COUNTDOWN RUN"
182 IF STICK(0)<>15 THEN 182
185 IF STICK(0)=14 THEN TP=7400:TIGS=7600:TCNT=1:GOTO 190
187 IF STICK(0)=13 THEN TP=7300:TIME=0:TIGS=7500:TCNT=0.05:GOTO 190
188 GOTO 185
190 WX=0:WY=0:TIME=0:TIMEL=LTIM:PP=0:ADTIM=0
195 GRAPHICS 18:POKE 756,STLL/256
200 FOR L=1 TO 20:POSITION WX,WY:WX=WX+1:? #6;CHR$(42):NEXT L:IF WY=0 THEN WY=10:WX=0:GOTO 200
205 WX=0:WY=0
210 FOR L=1 TO 11:POSITION WX,WY:? #6;CHR$(42):WY=WY+1:NEXT L:IF WX=0 THEN WX=19:WY=0:GOTO 210
300 FOR L=1 TO 10:READ XX,YY:POSITION XX,YY:PRINT #6;CHR$(224):NEXT L:RESTORE 10000
310 POSITION 1,5:? #6;CHR$(163)
320 GOSUB 9000:GOSUB TP
400 S=7:X=1:Y=5
450 IF STICK(0)=15 THEN 450
500 TIME=TIME+TCNT:IF TIME>=1 THEN GOSUB TIGS:TIME=0:IF STICK(0)=15 THEN FOR T=1 TO 19:NEXT T
505 FOR T=1 TO 20:NEXT T:POKE 77,0
510 S=STICK(0):SG=STRIG(0)
540 IF STICK(0)=15 THEN SOUND 0,255,6,1
550 IF STICK(0)<>15 THEN SOUND 0,70,6,4
1000 IF PP=10 AND TP=7400 THEN SOUND 0,0,0,0:GOTO 9100
1005 IF PP=10 AND TP=7300 THEN SOUND 0,0,0,0:GOTO 9200
1007 IF S=14 THEN D=1:GOSUB 3000:Y=Y-1:CARHED=161:GOSUB 4000
1010 IF S=7 THEN GOSUB 3000:X=X+1:CARHED=163:GOSUB 4000
1012 IF S=11 THEN GOSUB 3000:X=X-1:CARHED=164:GOSUB 4000
1014 IF S=13 THEN GOSUB 3000:Y=Y+1:CARHED=165:GOSUB 4000
2000 GOTO 500
3000 POSITION X,Y:PRINT #6;" ":RETURN
4000 IF STRIG(0)=0 THEN GOSUB 7000
4040 LOCATE X,Y,OB
4045 IF OB=224 AND GNU=LGNU THEN GOSUB 5000:GOTO 1000
4050 IF OB=GNU THEN GOTO 8000
4060 IF OB<>32 THEN GOTO 6000
4500 POSITION X,Y:PRINT #6;CHR$(CARHED):RETURN
5000 POSITION X,Y:PRINT #6;CHR$(92):FOR T=1 TO 7:SOUND 1,40,8,15:SOUND 2,70,2,15
5010 NEXT T:SOUND 1,0,0,0:SOUND 2,0,0,0:PP=PP+1:RETURN
5500 POSITION BX,BY-1:PRINT #6;CHR$(92):FOR T=1 TO 10:SOUND 1,50,8,15:NEXT T:SOUND 1,0,0,0:PP=PP+1:RETURN
6000 TRAP 6000:SOUND 0,0,0,0:FOR L=1 TO 10:READ A,B
6005 LOCATE A,B,BO
6010 IF BO=32 THEN NEXT L:IF L=11 THEN RESTORE 10000:GOTO 6100
6020 POSITION A,B:? #6;CHR$(92):FOR T=1 TO 7:SOUND 2,40,8,15:SOUND 1,30,8,15:NEXT T
6030 SOUND 2,0,0,0:SOUND 1,0,0,0:POSITION A,B:? #6;" ":NEXT L:RESTORE 10000
6050 IF PTS>HPTS THEN HPTS=PTS
6100 GRAPHICS 18:POSITION 5,0:? #6;"game over":IF TP=7400 THEN 9105
6105 POSITION 1,2:? #6;"SCORE=";PTS:POSITION 1,4:? #6;"high score=";HPTS
6110 PTS=0:IF LL=9 THEN LTIM=20
6120 IF LL=26 THEN LTIM=70
6130 GOTO 9110
7000 FOR T=1 TO 10 STEP 2:SOUND 0,70-T,6,4:NEXT T:FOR T=1 TO 10:SOUND 0,50,6,4:NEXT T
7005 IF S=14 THEN Y=Y-1
7010 IF S=7 THEN X=X+1
7020 IF S=11 THEN X=X-1
7030 IF S=13 THEN Y=Y+1
7040 IF TP=7400 THEN TIME=TIME+3
7050 RETURN
7300 POSITION 1,11:? #6;"TIM LFT=";TIMEL;:? #6;" PTS=";PTS:RETURN
7400 POSITION 1,11:? #6;"TIME=";ADTIM:RETURN
7500 TIMEL=TIMEL-TIME:POSITION 10,11:? #6;" ":POSITION 9,11:? #6;TIMEL:IF TIMEL=0 THEN 6000
7510 RETURN
7600 ADTIM=ADTIM+TIME:POSITION 6,11:? #6;ADTIM:RETURN
8000 GNU=GNU+1:FOR T=1 TO 5:SOUND 1,30,10,8:NEXT T:SOUND 1,0,0,0:GOTO 4500
9000 GNU=NU:FOR L=1 TO LL
9010 NX=INT(18*RND(1))+1:NY=INT(9*RND(1))+1
9020 LOCATE NX,NY,NL
9030 IF NL<>32 THEN 9010
9040 POSITION NX,NY:? #6;CHR$(GNU):GNU=GNU+1:NEXT L:GNU=NU:RETURN
9100 GRAPHICS 18:POSITION 1,1:? #6;"TIME=";ADTIM:IF ADTIM<BTIM THEN BTIM=ADTIM
9105 IF BTIM=90000 THEN 9110
9107 POSITION 1,3:? #6;"best time=";BTIM
9110 POSITION 1,6:? #6;"push joystick for-":POSITION 1,7:? #6;"ward for SAME GAME."
```

continued on page 101

FLIP SIDE

How computers can help the schools

by JOHN AND MARY HARRISON

Last month we looked at how computers can be used in the classroom to help students learn. However, there are two other areas in education for which computers are used — administration and Computer-Managed Instruction (CMI). This month we will examine how the computer can improve the efficiency of our schools and the implications of such use.

ADMINISTRATIVE USES

Schools may be in charge of educating our youth, but they are also businesses — big businesses. Supplies must be bought, bills paid, payroll calculated, insurance plans evaluated and scores of federal records kept. Long before it was popular to have a computer in the classroom, school districts were turning to the machines to reduce some of this burden.

A large school district has thousands of students and hundreds of employees in many different schools. The information generated by each school throughout the year is periodically examined, organized and tabulated. Once it has become part of a data base, the superintendent can know in minutes, rather than days, the student-teacher ratio, the number of children on the federal free-lunch program, or which schools offer calculus and advanced biology.

It is not necessary to be a large district to see the benefits of such organization. Principals of public and private schools have searched for more efficient methods of keeping attendance, generating report cards, scheduling classes and maintaining permanent student records.

Computers may be used by librarians so that a topic can be researched quickly, thoroughly and painlessly. To prepare the inevitable reports, both librarians and office secretaries appreciate the benefits of word processing and data base programs.

Individual teachers have taken advantage of the computer's speed and organizational capabilities to store and calculate grades and generate practice problems.

WHAT IS CMI?

Computer-Managed Instruction (CMI) is the use of the computer to maintain records associated with student performance. This usually includes, but is not limited to, the results of particular Computer-Aided Instruction (CAI) packages. As the student completes each lesson, the computer stores the progress, scores and records the results of all tests or quizzes completed, and provides progress reports to the teacher. These reports, either individual or class-wide, may be used to rapidly identify unsatisfactory progress or weak areas. An individualized curriculum could be written for each student allowing the teacher to more effectively utilize the limited class time available.

The ultimate fear of CMI is that it might result in the drastic reduction of teachers with only the computer controlling the progress and instruction of the student. This ignores the personal and motivational relationship between student and teacher and the development of social and academic skills that occurs in a classroom of peers. The free exchange of ideas and techniques encouraged by the teacher assists the child's maturing process. The elimination of teachers should not be a goal in the use of computers in education; rather we should be examining how we can use computers to help the teacher and make better use of the limited teacher resources available.

IMPLICATIONS FOR SCHOOLS AND PARENTS

The most serious apparent hazard of computer use in the schools is the potential lack of security and confidentiality for student and personnel records. It is probably no coincidence that Congress gave students the right to examine and contest their school records in the same year that it attempted to provide privacy protection for all citizens. Since 1974, school records must be accurate, up-to-date and private.

With an entire class (or school) record stored on magnetic media, several problems can arise. First we must prevent the

continued on page 72

John and Mary Harrison are parents, teachers and ATARI hobbyists. Mary teaches math and computer science at the high school level. John holds an M.S. in computer science and develops educational software. They will be coordinating the Education Department for ANTIC.

FLIP SIDE *continued from page 70*

imaginative or vindictive student from unauthorized access to or alteration of his or another student's records. Secondly, we must insure that frequent backup copies are made and archived so that a computer casualty does not eliminate an entire semester's results. Finally, we must not overwhelm the administration or teacher with computer-related tasks. Just because it is possible to keep more information and generate more reports does not mean that we should do it.

When mainframe or minicomputers were providing the bulk of computing resources to the classroom, the protection of student records was relatively simple. Often, not even the teacher had sufficient information to alter records. Each machine's operating system was designed to provide several levels of security to user and system files. As microcomputers become more widely used, the built-in security of the larger machines is often lost. The ultimate responsibility for security of student information rests with the individual school and with each teacher implementing CMI in the classroom. While more sophisticated protection schemes are being implemented, schools must develop and maintain their own security procedures.

In the area of archiving, software publishers need to cooperate with their customers. Schools will not purchase expensive software or fragile media if they are unable to make archive and record copies. Often one copy of a program is worse than none. Where separate data diskettes or tapes are used, the teacher must make it a part of daily routine to backup each class period. It only takes one loss-of-data accident to emphasize the catastrophic results of not maintaining backup copies.

In the last area, school systems that intend to computerize should be willing to train the personnel involved. Administrators need to be consulted frequently to decide which reports should be discontinued and what additional information is desired. Schools could fund workshops for its implementation and solicit suggestions for future capabilities.

Parents need to become active in the decision-making process. They can ask questions, volunteer expertise, or sit on committees that select the hardware and software to be used in the school. Most of all, they can be supportive as the new materials are implemented while demanding that high standards be maintained in the education of their children.

THE ATARI FAMILY

No microcomputer will satisfy the needs of a large school system. Even large high schools may find it easier to share administrative packages via terminals from a central mainframe or minicomputer. Small private schools and individual teachers will benefit most from using the microcomputer.

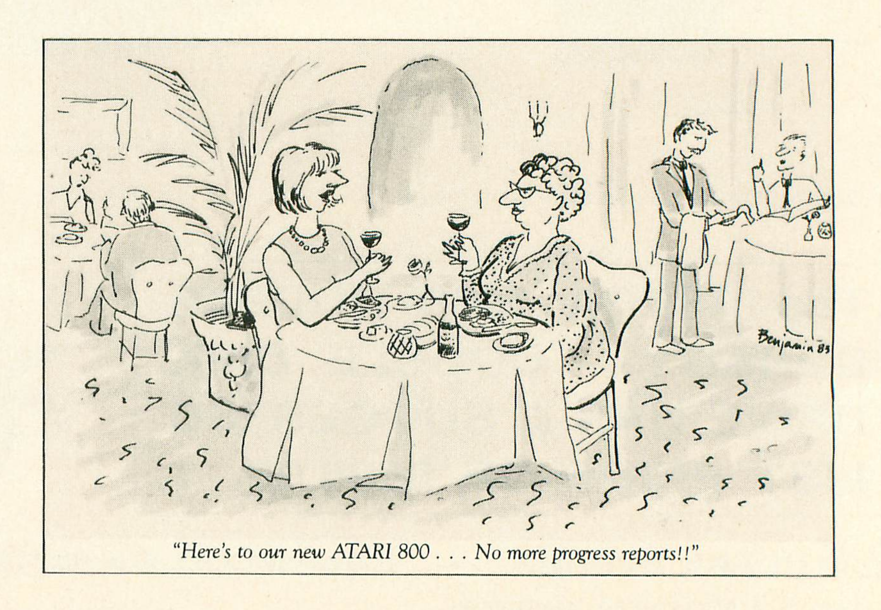
A microcomputer, especially the ATARI, is more than capable of handling an individual teacher's computer chores. We have used an ATARI 800 with a single disk drive and 48K of memory to maintain the grade records of six high school classes over the past year. This typically requires about 30 minutes per week for data entry and allows us to easily generate weekly progress reports or final grade calculations. This eliminates hours of calculation the night before these reports are required. Although this is a program of our own design, there are several available at reasonable prices that accomplish the same tasks.

Several publishers — including Milliken, SRA, and McGraw-Hill — have begun to respond to the rapidly growing education market. The amount of CMI available for the classroom expands each day, making the teacher's and administrators job more difficult due to the sheer volume of material to be reviewed. Through persistence and careful planning, it is possible to select CMI packages to augment the regular classroom routine in almost any subject. Once the individual packages have been identified, the teacher must integrate them into the instructional process so they appear as natural extensions of the traditional classroom.

On the home front, some publishers are starting to realize there is an even larger untapped audience for educational software. By incorporating some of the basic record keeping found in CMI packages, anyone can expand their educational horizons at home in a pleasant and painless manner while documenting their progress and problem areas.

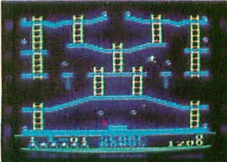
NEXT MONTH

This concludes our overview of computer use in education. Over the next several months we will explore many of the special features of the ATARI computer by developing a preschool educational game.



"Here's to our new ATARI 800 . . . No more progress reports!!"

JUMPMAN'S A GREAT GAME. BUT YOU'VE GOT TO WATCH YOUR STEP.



Meet the Alienators. A fiendish bunch who've planted bombs throughout your Jupiter Command Headquarters.

Your job? Use your lightning speed to scale ladders, scurry across girders, climb ropes and race through 30 levels to defuse the bombs before they go off.

That's the kind of hot, non-stop action we've packed into the award-winning,* best-selling Jumpman,™ and into Jumpman Jr.,™ our new cartridge version with 12 all-new, different and exciting screens.

Both games force you to make tough choices. Should you avoid that Alienator, climb to the top and try to work your way down, or try to hurdle him and defuse the bombs closest to you before they go off?

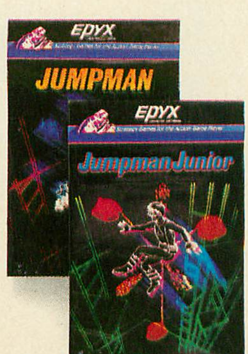
If you move fast you'll earn extra lives. But if you're not careful, it's a long way down.

So jump to it. And find out why Jumpman and Jumpman Jr. are on a level all their own.

One to four players; 8 speeds; joystick control. Jumpman has 30 screens. Jumpman Jr. has 12 screens.



STRATEGY GAMES FOR THE ACTION-GAME PLAYER.



*1983 C.E.S. award winner.

microscreens

by DAVID MILLIGAN



Those of us using Micro-Painter (DataSoft) for our computer art have been frustrated by the inability to transfer completed screens from Micro-Painter format to our BASIC (or other) programs. We need a utility for this.

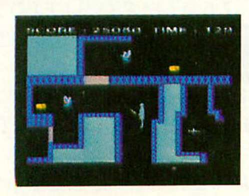
I have designed one that will load a Micro-Painter file correctly to BASIC by building an ANTIC Mode E display list and using a machine-language loader routine (see listings).

Microloader works on any Micro-Painter file. Type the filename and press [RETURN]. The screen goes black for four seconds while the ATARI builds the Mode E display list. Your disk drive then comes on and loads the screen, which takes eight seconds. If the colors aren't right, don't worry. Sometimes DOS has to collect its data from various parts of the disk, which produces false colors. These will be corrected when the load is complete.

Listing 1 is the main utility. I used two custom display lists; the first uses GR. 0, 1 and 2 for the title page. Lines 250-310 build the ANTIC Mode E display list. Listing 2 is a short version that can be listed to disk and used as a subroutine in a BASIC program. Listing 3 is source code for the machine-language loader routine, for those of you interested.

continued on page 105

WELCOME TO APSHAI. YOU'RE JUST IN TIME FOR LUNCH.



Boy, have you taken a wrong turn. One moment you're gathering treasure and the next you're being eyed like a side of beef.

You're in the Gateway to Apshai.™ The new cartridge version of the Computer Game of the Year,* Temple of Apshai.™

Gateway has eight levels. And over 400 dark, nasty chambers to explore. And because it's joystick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy.

Is it treasure you're after? Or glory? You'll live longer if you're greedy, but slaying monsters racks up a higher score.

The Apshai series is the standard by which all other adventure games are judged. And novices will not survive.

They'll be eaten.

One player; Temple of Apshai, disk/cassette; Gateway to Apshai, cartridge, joystick control.



STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

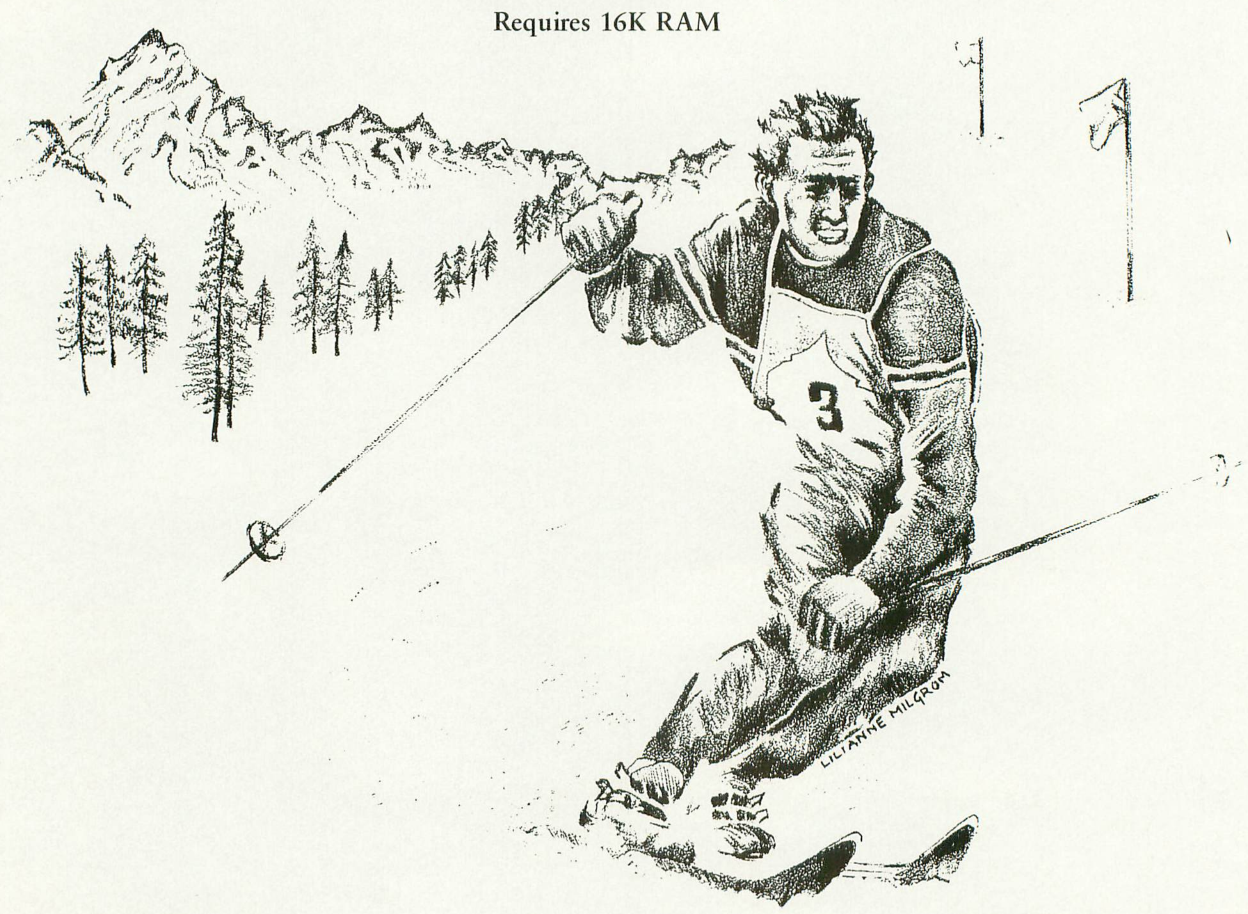


*Game Manufacturers Association, 1981

MOUNTAIN SKIING

by ANDRE PERSIDSKY — age 12

Requires 16K RAM



Mountain Skiing is a simple but fast-paced game. The object is to survive on the slopes as long as possible without crashing. You will receive one point every time you hear a beep, and achieve one goal every 20 points. You must avoid all trees, rocks, and bushes.

Andre programs in BASIC, and is learning PILOT and assembly language. He lives in San Francisco and goes to Zion Lutheran School. His program revives our Kids' Korner as part of our Education Department. Submissions from younger ATARI enthusiasts are welcome.

```
1 REM MOUNTAIN SKIING BY ANDRE PERSIDS
KY FOR ANTIC MAGAZINE
10 PRINT CHR$(125):POKE 752,1:POSITION
 12,12:PRINT "MOUNTAIN SKIING ":POSITIO
N 10,13:? "BY ANDRE PERSIDSKY":?
20 ? "THE OBJECT OF THIS GAME IS TO PA
SS THE TREES,ROCKS AND BUSHES WITHOUT
     GETTING HIT.";
30 ?:? "EVERY TIME YOU HEAR A BEEP, Y
OU SCORE ONE POINT."
40 ? "IF YOU GET MORE THAN 19 POINTS Y
OU    WILL HAVE REACHED YOUR GOAL. YO
UR    SCORE WILL GO BACK TO ZERO ";
```

```
50 ? "BUT YOU    WILL HAVE ONE GOAL WH
ICH IS EQUAL TO 20 POINTS."
60 PRINT "IF YOU CRASH YOU WILL SEE HO
W MANY    LEFT OVER POINTS YOU HAVE AN
D ALSO HOW MANY GOALS YOU REACHED."
70 ? "USE YOUR JOYSTICK TO CONTROL THE
 SKIER WHO IS IN THE MIDDLE OF THE SCR
EEN TO MOVE LEFT AND RIGHT."
80 ?:? "PRESS ANY KEY TO START.":POKE
 764,255:POKE 77,0
90 IF PEEK(764)=255 THEN 90
100 ? "↖":POKE 752,1
110 S=PEEK(88)+256*PEEK(89)
120 SETCOLOR 2,0,0
130 A=S+460
140 ST=STICK(0):?
150 POKE A,87
160 A=A-1*(ST=11)+1*(ST=7)
170 R=S+880+INT(40*RND(1)):POKE R,72:P
OKE R+1,74
180 SC=SC+1:IF SC>25 THEN SC=1:SD=SD+1
:SOUND 0,5,10,15:FOR W=1 TO 3:NEXT W:S
OUND 0,0,0,0
190 IF SD>9 THEN POKE R+10,80
200 IF SD>14 THEN POKE R+7,84
210 IF SD>19 THEN GOTO 300
220 IF PEEK(A+40)<>0 THEN 250
230 POKE A+40,0
240 GOTO 140
250 SOUND 0,255,8,15:FOR W=1 TO 300:NE
XT W:SOUND 0,0,0,0
260 PRINT "YOU HAVE CRASHED,YOUR SCORE
 IS ";SD;".YOU REACHED GOAL ";G;:FOR W
=1 TO 1000:NEXT W:? CHR$(125)
270 PRINT "PRESS TRIGGER TO PLAY AGAIN
."
280 IF STRIG(0)=0 THEN CLR :GOTO 100
290 GOTO 280
300 G=G+1:FOR C=S+880 TO S+919:POKE C,
83:NEXT C:? "GOAL ";G;" IS REACHED":FO
R W=1 TO 1000:NEXT W
310 PRINT CHR$(125):PRINT "SO FAR YOU
HAVE  REACHED GOAL ";G:? "GOODLUCK":FO
R W=1 TO 1200:NEXT W
320 PRINT CHR$(125)
330 SD=0
340 GOTO 110
```

TYPO TABLE

Variable checksum = 103894

Line num	range	Code	Length
1 -	50	QE	509
60 -	160	QG	510
170 -	260	CX	580
270 -	340	WH	327

letters

CHRISTMAS PRESENT

Last Christmas I received an ATARI 400 and a 410 Program Recorder. I love it and have created some games. Here is a sample screen from one of them.

I would like to know how to "turn off" the TV screen to speed up the display of my graphics, and to give them a more professional look.

Matt Gingerich
age 13
Mt. Pleasant, IA

```
10 GRAPHICS 7+16:SETCOLOR 4,14,14:
   SETCOLOR 2,14,14:COLOR 1
20 FOR D=1 TO 80 STEP 3:PLOT D,0:DRAWTO
   0,D:DRAWTO D,95:NEXT D
30 FOR D=159 TO 80 STEP -3:PLOT D,0:
   DRAWTO159,D-64:DRAWTO D,95:NEXT D
40 COLOR 2:PLOT 80,30:DRAWTO 80,60
50 PLOT 75,30:DRAWTO75,45:DRAWTO 60,60
60 PLOT 85,30:DRAWTO 85,45:DRAWTO 100,60
70 GOTO 70
```

To turn off the video display, first store the contents of memory location 559 in a variable:

TEMP=PEEK(559)

Then POKE 559,0, to temporarily turn off the ANTIC chip, thus speeding processing time by up to 30%. Then POKE 559,TEMP to restore the video display.

SHORT BUT PRETTY

I am 14 and starting to write programs. My favorite computer subject is graphics. I wrote this program — it's short but pretty to watch. Try it:

```
10 GRAPHICS 11
20 C=C+1: CO. C
30 PLOT 79*RND(1), 191*RND(1)
40 DRAWTO 40,95
50 GOTO 20
```

Sean Zawyer
Miami, FL



AUTOBOOT FOR CASSETTES

by CARL EVANS and ERIC VERHEIDEN

There was a rather technical article in ANTIC, June 1983, titled "Autoboot for BASIC." I contacted Eric Verheiden, the author, and asked him to customize his program for creating AUTORUN.SYS files on a cassette. This is the result of that collaboration. The BASIC program listed in this article contains the DATA statements you will need to put this routine in your own computer.

AUTOCAS loads a small machine-language program into Page Six of your computer's memory. Once the routine is loaded, all you do is enter the command X = USR(1536) to invoke it. AUTOCAS will then "beep" at you to remind you to put a cassette in your 410/1010 Program Recorder. When you have a tape properly put in the recorder, press the [RETURN] key and AUTOCAS will write a small program onto your tape. Now, simply CLOAD your favorite BASIC program and CSAVE it on the AUTOCAS tape. You will then have a copy of your BASIC program that will load just like any other boot tape.

That is all you really need to know to use AUTOCAS, but you might like to understand a little bit of how it does its tricks. Essentially, AUTOCAS writes a small machine-language program onto your cassette. The small program loads like any other boot file would, then it executes a forced read on the screen of two BASIC commands: CLOAD and RUN. That's it. This is very similar to what a disk-based AUTORUN.SYS program normally does for a disk file.

It is possible to make one of these "AUTO" routines do a lot of other things, but that would require some knowledge of 6502 assembly language and source code for AUTOCAS. I am only giving you the BASIC POKE version of AUTOCAS in this article.

USER'S GUIDE TO AUTOCAS

Here is a step-by-step explanation of how to use this program. I will assume that you have already typed AUTOCAS into your computer and CSAVE'd it to a cassette.

STEP 1. Make sure the BASIC cartridge is in your computer and that ALL peripherals are turned OFF. (AUTOCAS will not work properly if the 850 Interface Module or a disk drive is turned ON.)

STEP 2. Put your cassette copy of AUTOCAS in your recorder and press the [PLAY] button.

STEP 3. Enter CLOAD and, when the computer beeps, press the [RETURN] key. Your copy of AUTOCAS will then load like any normal BASIC program. When it has loaded, type RUN and press the [RETURN] key. A title page will come up on the screen. You will be asked to press [START] when you are ready to write the AUTO routine to the cassette.

STEP 4. Insert a blank tape into your recorder and completely rewind the tape. Press the [RECORD] and [PLAY] buttons on the recorder. Now press the [START] key and AUTOCAS will write a short program on the tape.

STEP 5. You will now see a new message on the screen. It will prompt you to press the [START] key to CLOAD your own program. That will be the program you want to make into an auto-load program. Remove the first tape, without rewinding it, and insert your favorite program. Press the [START] key. The screen will clear and your program will start loading. This process will erase the BASIC portion of AUTOCAS from memory.

STEP 6. You can now repeat the process for other BASIC programs without loading the original AUTOCAS program back in your computer because the important machine-language routine is still in the computer. CLOAD another program and enter the direct command X = USR(1536). You will hear the familiar double beep. When you press the [RETURN] key the little auto-load routine will be written out to tape again. You can then CSAVE the second BASIC program to make it an auto-load program too. AUTOCAS will not auto-load more than one program. However, your BASIC program can always load another program.

continued on page 80

AUTOBOOT FOR CASSETTES *continued from page 78*

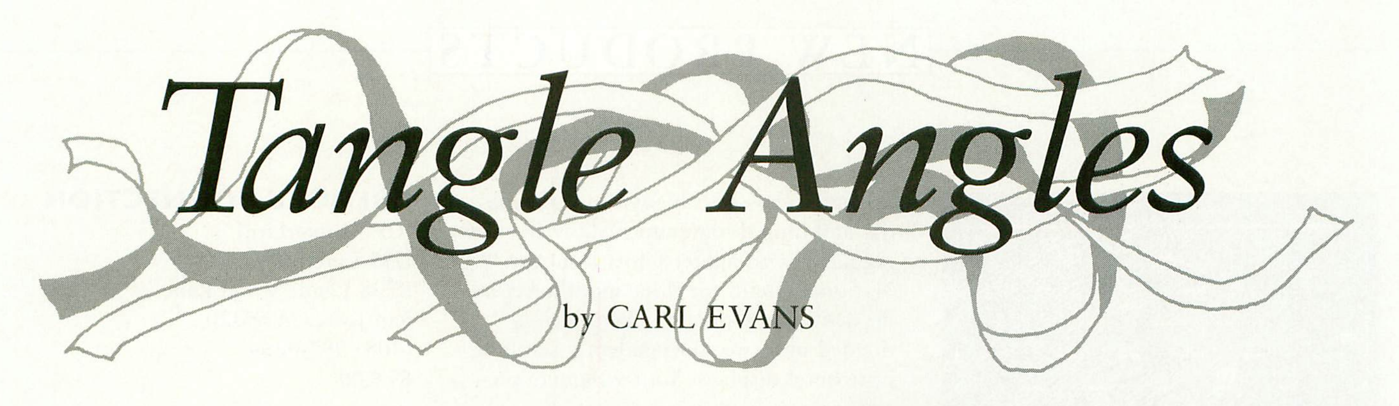
```
100 REM AUTOCAS.BAS REV 1.0 - 06/12/83
ANTIC MAGAZINE
110 GRAPHICS 18:POKE 53774,64:POKE 16,
64
120 POSITION 6,1:PRINT #6;"autocas"
130 POSITION 8,3:PRINT #6;"BY"
140 POSITION 3,4:PRINT #6;"ERIC VERHEI
DEN"
150 POSITION 8,5:PRINT #6;"AND"
160 POSITION 4,6:PRINT #6;"CARL M. EVA
NS"
170 POSITION 2,9:PRINT #6;"INITIALIZIN
G....":GOSUB 310
180 POSITION 0,9:PRINT #6;"PRESS start
 TO WRITE"
190 POSITION 0,10:PRINT #6;" AUTORUN T
O CASSETTE"
200 POKE 711,16*INT(16*RND(0))+7+INT(5
*RND(0))
210 POKE 709,16*INT(16*RND(0))+7+INT(5
*RND(0))
220 IF PEEK(53279)<>6 THEN 200
230 POKE 764,12:X=USR(1536)
240 POSITION 0,9:PRINT #6;"PRESS start
 TO CLOAD"
250 POSITION 0,10:PRINT #6;" YOUR BASI
C PROGRAM "
260 POKE 711,16*INT(16*RND(0))+7+INT(5
*RND(0))
270 POKE 709,16*INT(16*RND(0))+7+INT(5
*RND(0))
280 IF PEEK(53279)<>6 THEN 260
290 GRAPHICS 0:POKE 16,192:POKE 53774,
247:POKE 764,12:CLOAD
300 END
310 DATA 104,162,48,169,3,157,66,3
320 DATA 169,75,157,68,3,169,6,157
330 DATA 69,3,169,8,157,74,3,169
340 DATA 128,157,75,3,32,86,228,169
350 DATA 11,157,66,3,169,128,157,68
360 DATA 3,169,6,157,69,3,169,0
370 DATA 157,72,3,173,129,6,157,73
380 DATA 3,94,73,3,126,72,3,32
390 DATA 86,228,169,12,157,66,3,32
400 DATA 86,228,96,67,58,155,0,0
410 DATA 0,0,0,0,0,0,0,0
420 DATA 0,0,0,0,0,0,0,0
430 DATA 0,0,0,0,0,0,0,0
440 DATA 0,0,0,0,0,0,0,0
450 DATA 0,0,0,0,0,0,0,0
460 DATA 0,0,0,0,0,0,0,0
470 DATA 0,1,128,6,141,6,169,60
480 DATA 141,2,211,24,96,174,64,3
490 DATA 189,27,3,133,212,141,213,6
500 DATA 189,28,3,133,213,141,218,6
510 DATA 160,15,177,212,153,112,6,136
520 DATA 16,248,169,190,141,116,6,169
530 DATA 6,141,117,6,169,112,157,27
540 DATA 3,169,6,157,28,3,96,162
550 DATA 255,232,142,192,6,189,235,6
560 DATA 16,30,72,169,32,224,9,144
570 DATA 19,174,64,3,169,0,157,27
580 DATA 3,169,0,157,28,3,169,0
590 DATA 133,9,169,255,141,252,2,104
600 DATA 160,1,96,67,76,79,65,68
610 DATA 155,82,85,78,155,0,0,0
620 DATA 0,0,0,0,0,0,0,0
630 MLSTART=1536
640 MLEND=1791
650 RESTORE :SUM=0
660 FOR X=MLSTART TO MLEND
670 READ Y:SUM=SUM+Y
680 POKE X,Y:NEXT X
690 IF SUM<>18793 THEN GRAPHICS 0:PRIN
T "ERROR IN DATA TABLE";CHR$(253):END
700 RETURN
```

TYPO TABLE

Variable checksum = 125702

Line num	range	Code	Length
100 -	200	AM	557
210 -	300	YU	505
310 -	420	QP	343
430 -	540	RJ	335
550 -	660	MG	292
670 -	700	YK	97

Tangle Angles



by CARL EVANS

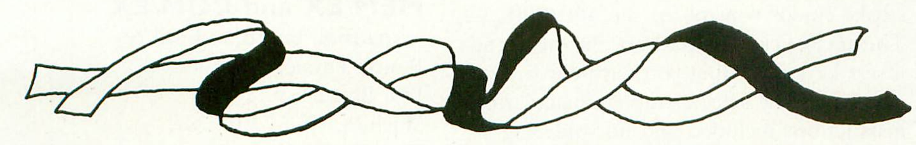
You previously stated that increasing the baud rate of the cassette load makes things go kaput. Enclosed find a bootload tape program, called Cassabauda, that will increase baud to 820 and function as reliably as the regular 600 baud. I'm selling it here in Hawaii for $7.50.

Also, are you aware you can have a sort of "double-density" tape format? The ATARI OS will support records up to 256 bytes, but the current cassette handler deals in 132 bytes. This could be a great way to protect commercial tape programs.

Del Wong
Honolulu, HI

I tried the Cassabauda utility program, and it does indeed increase the cassette baud rate as you claim. I note that you chose a default baud rate of 820. I experimented with various baud rates using your program and found that 820 baud was the maximum rate that still gave reasonable reliability. Even your program did not cause the system to work reliably at 900 baud. Still, 820 baud is a 36 percent increase in speed, a good thing to have.

The record-length change you mention is currently being used by a number of cassette program companies to "protect" their software from being copied. Most of them don't use the full 256 data bytes per record, however. The ones I have analyzed typically use a number in the 140 to 150 range.



Why are there 18 seconds of lead time for cassettes? Is there some way to shorten this? What is the difference between BAUD and bits per second?

Al Jacobs
Silver Springs, MD

The leader tone on a cassette tape file is set by the Operating System to about 20 seconds. There is no good reason that it has to be that long. You can change the length of the leader tone, but you can only do this with machine language. I plan on writing about this sometime this year. I will give you a BASIC POKE program that will put such a machine language in memory. In fact, I probably will include a baud-rate control routine in the same program.

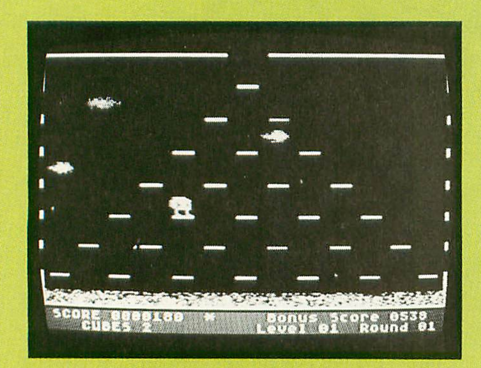
The word BAUD, like many scientific words, has a bit of history behind it. It commemorates a famous 19th-century, French pioneer in telegraphic communications: J.M.E. Baudot. The "baud" was the unit of measure for transmission speed for serial data communication. It represented the number of half-dot cycles transmitted continuously in one second (the modulation rate). Modulation rate can be thought of as the rate at which a carrier wave is adjusted to accommodate data transmission. In present day usage, the data-signalling rate (measured in bits per second) is usually equal to the modulation rate (expressed as baud). Thus the number of bits transmitted per second is equal to the baud rate. In our situation of asynchronous data transmission, the baud rate is equal to the bit rate when one stop bit is used.

I recently bought FROGGER on cassette from Sierra On-Line, but can't get it to load. I followed the instructions (no BASIC, turn computer on while pressing [START]). The recorder starts, but a BOOT ERROR message soon appears. I have tried everything. I took the tape back to the store, and it loaded okay there. I have no trouble loading other tapes, including my own. I have an older 410; could that be the problem? If so, is there anything I can do?

Carlos Ojeda
Monterey Park, CA

If you aren't having the same kind of problem with any other tapes, the probable cause is that the tape may be only a marginally good recording. If so, it might not load on the older 410 recorders. Take the tape and your recorder to the computer store and try loading the tape with your recorder and their computer. I would almost bet that it won't load. If this is indeed the case, then I suggest you try the HI-REL modification I described in ANTIC, April 1983. The schematic of the 410 also appears in that issue.

There are differences between the older 410 recorders and the newer ones. I have personally seen at least four completely different types. The first thing, and the most important, is that only the newest 410s have five percent resistors in them. All of the older recorders have ten percent resistors. This is the most likely cause of your loading problem. In addition, there are subtler differences that are not obvious. The circuit board layout and the motor housings vary depending upon where and when the recorders were made. The better ones were made in Japan. If you have one of those made in Hong Kong, let's just say that they are not the same. Incidentally, the new 1010 recorders are made in Hong Kong.



MR. COOL

(arcade game)
Sierra On-Line
36575 Mudge Ranch Road
Coarsegold, CA 93614
(209) 683-6858
8K — cartridge
$37.78

Watch this uppity ice-cube character — Mr. Cool — invade the pyro-pyramid and freeze out the Hot Springs and the Fireballs. His enemies constantly try to melt him and he has to act fast to avoid contact. The playfield simulates a furnace and you are the ice-cube in hostile territory.

DOS-MOD

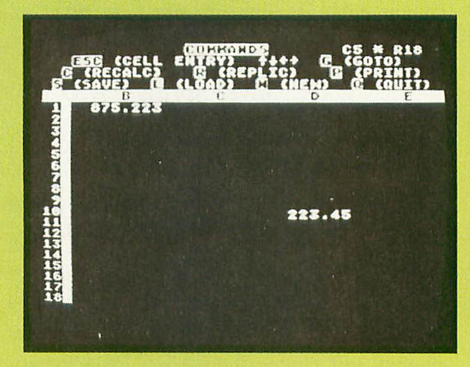
(utility)
Eclipse
1058-P Marigold Court
Sunnyvale, CA 94086
(408) 246-8325
$35.00 — diskette

Upgrade your Atari DOS 2.OS with this modification and enhancement software. Tutorial on flip side explains DOS functions. The major improvements include full use of the screen, one-line commands, options to control wild-card file operations and a reliable MEM.SAV facility. All of the changes were designed to use the same memory capacity to be compatible with existing programs.

WINGMAN

Microprose Software
1 Caribou Court
Parkton, MD 21120
(301) 357-4739
48K — cassette and diskette
$34.95

This aerial combat simulation for one to four players comes as close to real-life dogfighting as possible without risking life and limb. Programmer Sid Meier flew regularly with fighter pilots from the National Guard for three months before he wrote the program. The screen is divided into two independently scrolling horizontal displays. Your wingman protects you on raids.



HOME-CALC

Sim Computer Products, Inc.
1100 E. Hector St.
Whitemarsh, PA 19428
(215) 825-4250
16K — cassette — $29.95
24K — diskette — $39.95

Use this powerful and inexpensive spreadsheet for home and business calculations. With Home-Calc you can enter numbers, labels, or formulas in each cell. It enables you to add, subtract, multiply, divide, use the exponential guide, sum, and recalculate. The diskette version also features a "replicate" command. Maximum spreadsheet size is 510 cells for the 48K disk.

SINGLE STROKE CURSOR CONTROL

(hardware)
Wiser Electronics
2250 Natalie Ave.
Las Vegas, NV 89109
(702) 731-2608
$37.00

Save time and effort with this single stroke cursor control for the 400/800. The small keypad fits above the clear and insert keys providing you with cursor control in one step. Complete installation instructions included and no soldering is required. Specify 400 or 800 when you order.

CRITICAL CONNECTION

(CP/M interface)
USS Enterprises
6708 Landerwood Lane
San Jose, CA 95120
(408) 997-0264
$75.00

The Critical Connection allows you to run CP/M via hardware and software on your ATARI. The hardware connects to the serial port up to 15 feet away. The software replaces the Atari disk drives, printer and keyboard, simulating up to four drives. The entire system can be easily installed via a simple plug-in and one software command.

MOVIEMAKER

(graphics utility)
Reston Publishing Co.
11480 Sunset Hills Rd.
Reston, VA 22090
(703) 437-8900
16K — cartridge
$60.00

Anyone can become a director with this innovative new tool. You devise the action, set the scene, create the actors and play back the computer "movie." Use your imagination and your ATARI to make professional-looking animation.

ENJOYSTICK (TJS-400)

(game controller)
TG Products
1104 Summit Ave., Ste. 110
Plano, TX 75074
(212) 424-8568
$29.95

The first joystick designed and contoured to fit comfortably in the palm of the hand, the Enjoystick is also ambidextrous. It has a fire button on one side for use by right-handers and a switch for left-handed players. Another special feature it has is a self-centering control stick to prevent "joystick fatigue."

MEM/EX and COM/EX

(expansion board and utility)
Prairie Physics
P.O. Box 2369
Wichita, KS 67201
(316) 744-3650
$129.95

Expand your RAM and extend com-

mands on your BASIC or assembler cartridge with this hardware/software combination. Add 4K bytes of RAM, including the unused "$COOO" space with the board. The software disk enhances the languages by adding ten new direct-mode commands, including an instant number-base conversion and machine language monitor.

INFIDEL

(adventure game)
Infocom, Inc.
55 Wheeler St.
Cambridge, MA 02138
(617) 492-1031
48K — diskette
$49.95

The first in the new Infocom "Tales of Adventure Series", this prose adventure challenges you to find the buried entrance to the last great pyramid. Written by the author of Suspended, the game also features INTERLOGIC, a system that enables you to use complete sentences instead of the standard two-word commands.

BLACKJACK

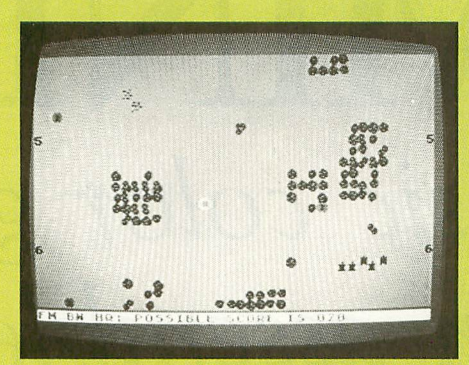
(simulation game)
Screenplay
P.O. Box 3558
Chapel Hill, NC 27514
(919) 493-8596
48K — diskette
$69.96

Turn your home into a Las Vegas casino with this realistic blackjack simulation. Learn to win — and win big — with this game written by Ken Uston, professional player and big winner. This program will teach you the techniques that won Uston $5 million!

HEXMASTER

(strategy game)
Dolphin Microware
410 Stanford Avenue
Palo Alto, CA 94306
(415) 321-6333
16K — cassette
32K — diskette
$19.95

If you are not perfectly delighted with this intense and exciting strategy game, the manufacturer will refund all your money within 10 days of purchase. The object of the game is to connect your areas of color to gain power and prevent your opponent from doing the same. You can play against the computer or another person in four modes.



COMBAT LEADER

(simulation game)
Strategic Simulations, Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043-1983
(415) 964-1353
48K — cassette and diskette
$39.95

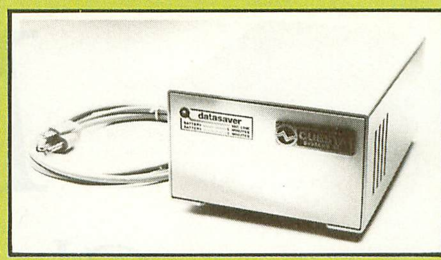
Here is a strategy war game that combines realism with speed. Combat Leader is historically accurate, contains realistic scenes of war from WWII to the 1980's, yet has all the challenging options of an exciting arcade game. The game has a scrolling battlefield on which you may direct over 70 tanks as the company commander.



INTERFAST-I

(printer buffer)
Advanced Interface Devices, Inc.
P.O. Box 2188
Melbourne, FL 32091
(305) 676-1275
$169.95

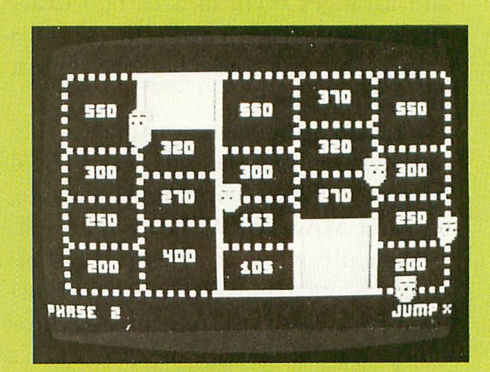
Reduce your printing time with this buffered programmable (4K) printer interface. It is compatible with the Atari 850 Interface and dumps program listings and text files within a few seconds. Advanced printing applications such as graphics characters are also possible and a special utility disk is available.



THE DATASAVER

(power backup)
Cuesta Systems, Inc.
3440 Roberto Court
San Luis Obispo, CA 93401
(805) 541-4160
$395.00 — 90 watt
$695.00 — 200 watt

Don't let interference or power outages destroy all your programming efforts. This battery-powered backup unit is available in 90 watt and 200 watt capacities. Both versions utilize a precision frequency standard and provide overvoltage suppression and EMI noise filtering.



TIME RUNNER

(arcade game)
Funsoft
28611 Canwood St.
Agoura, CA 91301
(213) 991-6540
16K — cassette and diskette
$29.95

Here is the first game in this company's Funarcade series for the ATARI. You must rush to stake out as much space for yourself as possible before time runs out. Watch out for the defender-droids and the Hyperspace traps. You may choose COAST or DIRECT moves and BEGINNER or EXPERT modes.

MAXTER MIND

Classic color game in assembler

by BOB POLIN

Requires 32K RAM

Many game players will be familiar with the two-player guessing game in which one player secretly picks several colors and arranges them in a certain order while the other player tries to guess the colors and the order in the fewest number of tries.

I tried to figure out how to make a solitaire version, and the only way I could do it was with a computer. At any rate, my game MAXTER MIND, is the result. I originally wrote it in assembly language, using Synassembler, then translated back to Atari's Assembler-Editor syntax for the convenience of ANTIC's readers. The code is reasonably short and simple, a good opportunity for assembly language beginners to examine an interesting program.

The program requires 32K and its run address is $7810. If you want to save it on an AUTORUN.SYS file, go to DOS menu item K and save it as

AUTORUN.SYS,7800,7D3F,,7810

The little face I use as a marker in the game is a redefined character.

The rules of MAXTER MIND are:

- The computer picks five different colors (from among eight) and arranges them in order, left to right.
- You cannot see the correct order until the game ends.
- The game ends when you have guessed the right order, or after you have guessed eleven times.
- Each "turn" consists of five selections you make with the joystick, followed by [RETURN].
- To start a new game press [START].
- If you give up, [OPTION] will end the game and show the answer.
- Move the joystick left or right to position the cursor (purple face) over the color you want for the rightmost position; press the trigger to confirm that choice.
- Repeat this process to select the remaining four colors.
- To rescind one or more choices press the spacebar.
- Any given color can only be used once per line, and a "click" indicates attempts at illegal entries.
- After each [RETURN] the computer displays clues (red or green bars) to inform you of the correctness of your choices.
- Each red bar means that one color in the line is correct, but in the wrong position.
- Each green bar means that both position and color of one choice are correct.
- When all colors are in the right position, the computer shows its matching series.

On the average, it takes about six or seven turns to solve the puzzle. I have done it in as few as four turns, but luck plays a large role. After playing awhile you will learn how to improve your guesses by analyzing previous turns and their results.

Bob Polin is a recent ATARI programmer who never learned BASIC. He started out in assembly language, which he taught himself using Atari's Assembler Editor cartridge and the book Your ATARI Assembler, *by Inman and Inman. He switched to the Synassembler, from Synapse Software in order to write Blue Max, a three-dimensional strafe, bomb and dodge game recently released by Synapse (see Product Reviews).*

```
10 ;     MAXTER MIND
20 ;        BY
30 ;      BOB POLIN
40 ;    ANTIC MAGAZINE
50 ;    ADAPTED FROM
60 ; SYNASSEMBLER VERSION
70 ;**********************
80 ;*G7810 TO RUN PROGRAM*
90 ;**********************
0100 .OPT NOLIST
0110  *=$7800
0120 SC=$7000          SCREEN
0130 PM=$7000          PLAYER-MISSILE
0140 P0=PM+$400
PLAYER  0
0150 P1=PM+$500
0160 P2=PM+$600
0170 P3=PM+$700
0180 MISL=PM+$300
MISSILES
0190 PMBASE=$D407
0200 NMIEN=$D40E
0210 CHBASE=$D409
0220 WSYNC=$D40A
0230 RANDOM=$D20A
0240 HPOP0=$D000
0250 HPOSP1=$D001
0260 HPOSP2=$D002
0270 HPOSP3=$D003
0280 HPOSM0=$D004
0290 SIZEP0=$D008
0300 SIZEP2=$D00A
0310 SIZEM=$D00C
0320 COLPM0=$D012
0330 COLPM2=$D014
0340 COLPM3=$D015
0350 COLPF0=$D016
0360 COLPF1=$D017
0370 COLPF2=$D018
0380 COLPF3=$D019
0390 COLBK=$D01A
0400 GRACTL=$D01D
0410 CONSOL=$D01F
0420 RTCLOCK=$14
0430 VDSLST=$200
0440 SDMCTL=$22F
0450 SDLSTL=$230
0460 STICK0=$278
0470 STRIG0=$284
0480 COLOR0=$2C4
0490 COLOR4=$2C8
0500 PCOLR0=$2C0
0510 PCOLR1=$2C1
0520 PCOLR2=$2C2
0530 PCOLR3=$2C3
0540 CH=$2FC
0550 POS=$B4
SCREEN POSITION
0560 ; OF CURRENT ENTRY
0570 CSRPOS=$600
CURSOR POSITION
0580 COUNTER=$601
0590 LINE1=$602
0600 LINE2=$607
0610 LINE3=$60C
0620 LINE4=$611
0630 LINE5=$616
0640 LINE6=$61B
0650 LINE7=$620
0660 LINE8=$625
0670 LINE9=$62A
0680 LINE10=$62F
0690 LINE11=$634
0700 ANSPOS=$639
ANSWER POSITION
0710 ;                 ON THE SCREEN
0720 TRIGV=$63E
TRIGGER VALUE
0730 NUMPCK=$63F
NUMBER OF
0740 ;                 PICK (0-4)
0750 ANSWER=$643
0760 GRNBAR=$648
NO. OF GRN BARS
0770 REDBAR=$649
NO. OF RED BARS
0780 VPOSBAR=$64A
VERTICAL POS OF
0790 ;            RED OR GRN BAR
0800 STRTPRS=$FE       NON 0=START
0810 ;                 BUTTON PRESSED
0820 TEMP1=$B0
TEMPORARY
0830 TEMP2=$B1
CALCULATION
0840 TEMP3=$B2
REGISTERS
0850 CHSET .BYTE 0,0,0,0,0,0,0,0
0860  .BYTE $7C,$FE,$BA,$EE,$BA
,$C6,$7C,0
0870  LDA #0
0880  STA STRTPRS
0890 START LDA #0
0900  STA SDMCTL
TURN OFF DMA
0910  LDX #$7F
0920 E STA $600,X      CLEAR 1/2 OF
0930  STA SC+300,X
PAGE 6 & PART
0940  DEX              OF SCREEN
0950  BPL E
0960  LDX #MISL&255
CLEAR PLAYER-
0970  STX TEMP1
MISSILE MEMORY
0980  LDX #MISL/256
0990  STX TEMP2
1000  LDX #5
1010  LDY #0
1020 C STA (TEMP1),Y
1030  DEY
1040  BNE C
1050  INC TEMP2
1060  DEX
1070  BNE C
1080  STA COLOR4
BLACK BKGD
1090  LDA #$2A         YELLOW
1100  STA PCOLR3
1110  LDA #$46         RED
1120  STA PCOLR0
1130  LDA #$C4         GREEN
1140  STA PCOLR1
1150  LDA #$CA
LIGHT GREEN
1160  STA PCOLR2
1170  LDA #DL&255
STORE ADDRESS
1180  STA SDLSTL
OF DISPLAY LIST
1190  LDA #DL/256
1200  STA SDLSTL+1
1210  LDA #DLIR1&255
STORE ADDRESS
1220  STA VDSLST
OF DISPLAY LIST
1230  LDA #DLIR1/256   INTERRUPT
1240  STA VDSLST+1     ROUTINE #1
1250  LDA #166
1260  STA VPOSBAR
1270  LDA #192         ENABLE DLI
1280  STA NMIEN
1290  LDA #3           ENABLE PM
1300  STA GRACTL       GRAPHICS
1310  STA SIZEM        QUAD SIZ
ED MISL
1320  LDA #62          ENABLE D
MA &
1330  STA SDMCTL       PM GRA
PHICS
1340  LDA #1           DRAW FACE
1350  STA SC+405       WITH CO
LOR 0
1360  STA SC+385       CURSOR
1370  STA COUNTER      INITIALIZE CNTR
1380  LDA #$41         COLOR 1
1390  STA SC+406
1400  LDA #$81         COLOR 2
1410  STA SC+407
1420  LDA #$C1         COLOR 3
1430  STA SC+408
1440  LDA #13          DRAW 1
2 LINES
1450  STA TEMP3        OF FACES
1460  LDA #SC+100&255  BLAC
K AT THIS
1470  STA TEMP1        POINT
1480  LDA #SC+100/256
1490  STA TEMP2        4 ON EACH
LINE
1500 G DEC TEMP3       USING
COLORS
1510  BEQ F            0 TO 3
1520  LDY #8
1530  LDX #3
1540 H LDA IM,X
1550  STA (TEMP1),Y
1560  DEY
1570  DEY
1580  DEX
1590  BPL H
1600  LDA TEMP1
1610  CLC
1620  ADC #20          NEXT LINE
1630  STA TEMP1
1640  BCC G
1650  INC TEMP2
1660  BNE G
1670 F LDX #10         PRINT
1680 I LDA MXMND,X
"MAXTER MIND"
1690  STA SC+44,X      ON TO
P OF
1700  DEX              SCREEN
1710  BPL I
1720  LDA #12          DRAW 1 FACE
1730  STA TEMP3        ON EACH
OF 12
1740  LDY #171         LINES WITH
1750 K LDX #7          PLAYER 3
1760 J LDA PLIM,X
1770  STA P3,Y
1780  DEY
1790  DEX
1800  BPL J
1810  DEC TEMP3
1820  BNE K
1830  LDY #208
1840  LDX #7           DRAW 4
1850 D LDA PLIM,X      FACES
1860  STA P0,Y         AT BOTTOM
1870  STA P1,Y         OF SCREEN
1880  STA P2,Y
1890  STA P3,Y
1900  DEY
```

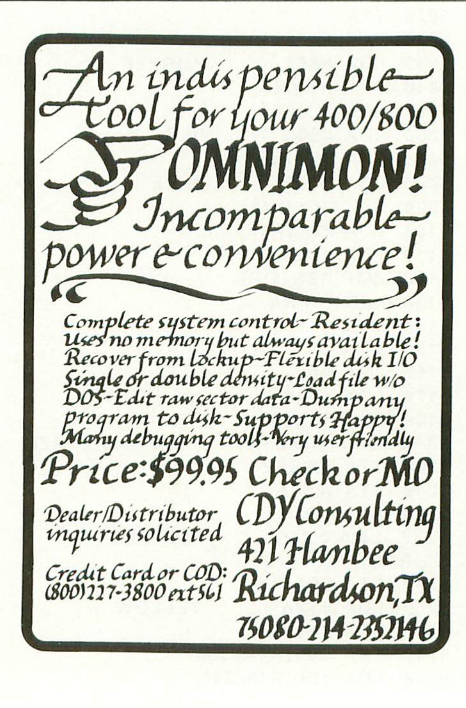
continued on next page

```
1910  DEX
1920  BPL D
1930  LDA #PM/256
1940  STA PMBASE
1950  LDA #128
1960  STA HPOSP3
1970  LDA #136
1980  STA HPOSP1
1990  LDA #144
2000  STA HPOSP2
2010  STA HPOSM0
2020  LDA #1
2030  STA TRIGV
2040  LDA #$FF
2050  STA POS
2060  LDA #4          PICK ANS
WER
2070  STA TEMP1
2080 L LDY #4
2090  LDA RANDOM
PICK COLORS
2100  AND #7
2110  TAX
2120  LDA COLOR,X
2130 M CMP ANSWER,Y
2140  BEQ L           COLOR EXISTS-
2150 ;              PICK AGAIN
2160  DEY
2170  BPL M
2180  LDX TEMP1       COLOR DOES
NOT
2190  STA ANSWER,X    EXIST-
STORE IT
2200  DEC TEMP1
2210  BPL L           PICK NEXT
COLOR
2220  JSR TIMER       DELAY
2230  LDA STRTPRS     START
GAME IF
2240  BNE SRT         <> 0
2250 N JSR CKSTRT
2260  LDA RTCLOCK     FLASH P
URPLE
2270  AND #$F         "MAXTER
MIND"
2280  ORA #$60
2290  STA COLOR0
2300  BNE N
2310 SRT JSR JOYST    SUBROU
TINE LOOP
2320  JSR CKSTRT      THAT PL
AYS THE
2330  JSR MOVE        GAME
2340  JSR CLEAR
2350  JSR OPT
2360  JSR TIMER
2370  JMP SRT
2380 CALC LDA #0      CALCUL
ATES THE
2390  STA GRNBAR      NUMBER OF
2400  STA REDBAR      CORRECT
CHOICES
2410  LDX #4          ON EACH LINE
2420  LDY POS
2430  STY TEMP1       CHECK HOW
MANY
2440 O LDY TEMP1      GRN BARS
2450  LDA LINE1,Y
2460  CMP ANSWER,X
2470  BNE P
2480  INC GRNBAR
2490 P DEC TEMP1
2500  DEX
2510  BPL O
2520  LDA #30         DELAY BEFORE
2530  STA TEMP1       PRINTING
RESULT
2540 Q JSR TIMER
2550  DEC TEMP1
2560  BNE Q
2570  LDY VPOSBAR
2580  LDA GRNBAR      PRINT G
RN BARS
2590  BEQ R           FOR CORRECT
2600  CMP #1          COLOR&
POS
2610  BEQ S
2620  CMP #2
2630  BEQ T
2640  CMP #3
2650  BEQ U
2660  CMP #4
2670  BEQ V
2680  LDX #4          GRNBAR=5
2690 W LDA ANSWER,X   PRINT
 CORRECT
2700  STA ANSPOS,X    ANSWER
2710  DEX
2720  BPL W
2730  INX             BLACKEN
2740  STX COLOR0      "MAXTER
MIND"
2750 X JSR CKSTRT
2760  LDA RTCLOCK     FLASH TOP
OF
2770  STA COLOR4      SCREEN
2780  JMP X
2790 S LDA #$40       1 GRN
BAR FOR
2800  BNE Y           EACH CHOICE
2810 T LDA #$50       CORRECT
IN BOTH
2820  BNE Y           COLOR AND
2830 U LDA #$54       POSITION
2840  BNE Y
2850 V LDA #$55
2860 Y STA P2+1,Y
2870  STA P2+2,Y
2880  STA P2+3,Y
2890 R LDA #4         CHECK HOW
MANY
2900  STA TEMP2       RED BARS
2910  LDY POS
2920 Z LDX #4
2930 AA LDA LINE1,Y
2940  CMP ANSWER,X
2950  BNE AB
2960  INC REDBAR
2970 AB DEX
2980  BPL AA
2990  DEY
3000  DEC TEMP2
3010  BPL Z
3020  LDY VPOSBAR
3030  LDA REDBAR
3040  SEC
3050  SBC GRNBAR
3060  BEQ AC
3070  CMP #1          1 RED BAR FOR
3080  BEQ AD          EACH CHO
ICE
3090  CMP #2          CORRECT IN
3100  BEQ AE          COLOR BUT
3110  CMP #3          INCORRECT IN
3120  BEQ AF          POSITION
3130  CMP #4
3140  BEQ BA
3150  LDA #1          USE MISL0 IF
3160  STA MISL+1,Y    5TH RED BAR
3170  STA MISL+2,Y    NEEDED
3180  STA MISL+3,Y
3190 BA LDA #$55
3200 AG STA P0+1,Y
3210  STA P0+2,Y
3220  STA P0+3,Y
3230 AC RTS
3240 AD LDA #1
3250  BNE AG
3260 AE LDA #5
3270  BNE AG
3280 AF LDA #$15
3290  BNE AG
3300 OPT LDA CONSOL   CHECK
IF OPTION
3310  CMP #3          PRESSED
=GIVE
3320  BEQ LANE        UP
3330  RTS
3340 LANE LDX #4
3350  STX CONSOL      CLICK S
PEAKER &
3360 AH LDA ANSWER,X  PRINT
ANSWER
3370  STA ANSPOS,X
3380  DEX
3390  BPL AH
3400 AI JSR CKSTRT
3410  JMP AI
3420 DLIR1 PHA
3430  TXA
3440  PHA
3450  LDA #3          QUAD SIZE
3460  STA SIZEP0
3470  STA SIZEP2
3480  LDA #$62        PURPLE
3490  STA WSYNC       WAIT TILL
HORIZ
3500 ;                BLANK BEFORE
3510 ;                CHANGING |
COLOR
3520  STA COLBK
3530  LDA #152
3540  STA HPOP0
3550  LDA #CHSET/256  CHARA
CTER SET
3560  STA CHBASE
3570  LDA #DLIR2&255
3580  LDX #DLIR2/256
3590 RESTORE STA VDSLST
3600  STX VDSLST+1    STORE
ADDRESS
3610  PLA             OF NEXT DL
IR &
3620  TAX             RESTORE
3630  PLA             REGISTERS
3640  RTI
3650 DLIR2 PHA
3660  TXA
3670  PHA
3680  LDA #0          BLACK
3690  STA WSYNC
3700  STA COLBK
3710  LDX #4
3720 AJ LDA ANSPOS,X  ANSPOS TO
3730  STA COLPM3,X    ANSPOS
+4 IS
3740  DEX             BLACK (0) TILL
3750  BPL AJ          ANSWER
PRINTED
3760  LDA #DLIR3&255
3770  LDX #DLIR3/256
3780  BNE RESTORE
3790 DLIR3 PHA
3800  TXA
3810  PHA
```

```
3820  LDX #4
3830 AK LDA LINE11,X    LINE11
TO LINE1
3840  STA COLPM3,X      ARE ALL
BLACK
3850  DEX               TILL CHOICES
3860  BPL AK            ARE ENTERED
3870  LDA #DLIR4&255    ON THEM
3880  LDX #DLIR4/256
3890  JMP RESTORE
3900 DLIR4 PHA
3910  TXA
3920  PHA
3930  LDX #4
3940 AL LDA LINE10,X
3950  STA COLPM3,X
3960  DEX
3970  BPL AL
3980  LDA #DLIR5&255
3990  LDX #DLIR5/256
4000  JMP RESTORE
4010 DLIR5 PHA
4020  TXA
4030  PHA
4040  LDX #4
4050 AM LDA LINE9,X
4060  STA COLPM3,X
4070  DEX
4080  BPL AM
4090  LDA #DLIR6&255
4100  LDX #DLIR6/256
4110  JMP RESTORE
4120 DLIR6 PHA
4130  TXA
4140  PHA
4150  LDX #4
4160 AN LDA LINE8,X
4170  STA COLPM3,X
4180  DEX
4190  BPL AN
4200  LDA #DLIR7&255
4210  LDX #DLIR7/256
4220  JMP RESTORE
4230 DLIR7 PHA
4240  TXA
4250  PHA
4260  LDX #4
4270 AO LDA LINE7,X
4280  STA COLPM3,X
4290  DEX
4300  BPL AO
4310  LDA #DLIR8&255
4320  LDX #DLIR8/256
4330  JMP RESTORE
4340 DLIR8 PHA
4350  TXA
4360  PHA
4370  LDX #4
4380 AP LDA LINE6,X
4390  STA COLPM3,X
4400  DEX
4410  BPL AP
4420  LDA #DLIR9&255
4430  LDX #DLIR9/256
4440  JMP RESTORE
4450 DLIR9 PHA
4460  TXA
4470  PHA
4480  LDX #4
4490 AQ LDA LINE5,X
4500  STA COLPM3,X
4510  DEX
4520  BPL AQ
4530  LDA #DLIR10&255
4540  LDX #DLIR10/256
4550  JMP RESTORE
4560 DLIR10 PHA
4570  TXA
4580  PHA
4590  LDX #4
4600 AR LDA LINE4,X
4610  STA COLPM3,X
4620  DEX
4630  BPL AR
4640  LDA #DLIR11&255
4650  LDX #DLIR11/256
4660  JMP RESTORE
4670 DLIR11 PHA
4680  TXA
4690  PHA
4700  LDX #4
4710 AS LDA LINE3,X
4720  STA COLPM3,X
4730  DEX
4740  BPL AS
4750  LDA #DLIR12&255
4760  LDX #DLIR12/256
4770  JMP RESTORE
4780 DLIR12 PHA
4790  TXA
4800  PHA
4810  LDX #4
4820 AT LDA LINE2,X
4830  STA COLPM3,X
4840  DEX
4850  BPL AT
4860  LDA #DLIR13&255
4870  LDX #DLIR13/256
4880  JMP RESTORE
4890 DLIR13 PHA
4900  TXA
4910  PHA
4920  LDX #4
4930 AU LDA LINE1,X
4940  STA COLPM3,X
4950  DEX
4960  BPL AU
4970  LDA #DLIR14&255
4980  LDX #DLIR14/256
4990  JMP RESTORE
5000 DLIR14 PHA
5010  TXA
5020  PHA
5030  LDA #$62          PURPLE
5040  STA WSYNC
5050  STA COLBK
5060  LDA #$32          RED
5070  STA COLPM0
5080  LDA #$94          BLUE
5090  STA COLPM2
5100  LDA #DLIR15&255
5110  LDX #DLIR15/256
5120  JMP RESTORE
5130 DLIR15 PHA
5140  TXA
5150  PHA
5160  LDA #0
5170  LDX #120
5180  STX HPOP0
5190  STA SIZEP0        NORMAL SIZE
5200  STA SIZEP2
5210  STA WSYNC
5220  STA COLBK
5230  LDA #$66          PURPLE
(CURSOR)
5240  STA COLPF0
5250  LDA #$2A          YELLOW
5260  STA COLPM3
5270  LDA #DLIR16&255
5280  LDX #DLIR16/256
5290  JMP RESTORE
5300 DLIR16 PHA
5310  TXA
5320  PHA
5330  LDA #$E           WHITE
5340  LDX #4            GRAY
5350  STA WSYNC
5360  STA COLPF0
5370  STX COLPF1
5380  LDA #$12          BROWN
5390  STA COLPF2
5400  LDA #$36          RED
5410  STA COLPF3
5420  LDA #DLIR1&255
5430  LDX #DLIR1/256
5440  JMP RESTORE
5450 CKERR LDA #5       CHECK IF 1
5460  STA TEMP3         COLOR USED
5470  LDY POS           TWICE ON THE
5480 AV LDA #0          SAME LINE BY
5490  STA TEMP1         COMPARING EACH
5500  LDA #5            COLOR WITH ALL
5510  STA TEMP2         COLORS ON ITS
5520  LDX POS           LINE
5530 AW LDA LINE1,Y
5540  CMP LINE1,X
5550  BNE AX
5560  INC TEMP1
5570 AX DEX
5580  DEC TEMP2
5590  BNE AW
5600  LDA TEMP1         SHOULD
=1
5610  CMP #2            BECAUSE
SAME
5620  BCS ERR           COLOR AS
ITSELF
5630  DEY
5640  DEC TEMP3
5650  BNE AV
5660  RTS
5670 ERR LDA #4         DISALLOW
ENTRY
5680  STA NUMPCK        BY BAC
KSPACING
5690  STA CONSOL        AND CLICKING
5700  LDX POS           SPEAKER
5710  LDA #0
5720  STA LINE1,X
5730  DEC POS
5740  PLA
5750  PLA
5760  RTS
5770 CKSTRT LDA CONSOL CHECK
START
5780  CMP #6            BUTTON
5790  BEQ AY
5800  RTS
5810 AY INC STRTPRS     START
PRESSED
5820  LDA #$6A          PURPLE
5830  STA COLOR0        "MAX MIND"
5840  PLA
5850  PLA
5860  JMP START
5870 MOVE LDA STRIG0
5880  CMP TRIGV         BRANCH IF
5890  BNE AZ            STATUS CHANGE
5900 BB RTS             IN FIRE BU
TTON
5910 AZ STA TRIGV
5920  CMP #1            NOT PRES
SED
```

continued on next page

```
5930  BEQ BB
5940  INC NUMPCK
5950  LDA NUMPCK
5960  CMP #5
5970  BNE BC
5980  LDA #0              COMPLETE LINE
5990  STA NUMPCK           ENTERED
6000 BC INC POS
6010  LDX POS
6020  LDY CSRPOS
6030  LDA COLOR,Y
6040  STA LINE1,X
6050  LDA NUMPCK
6060  BNE BB
6070  JSR CKERR
6080  JSR CALC
6090  LDA VPOSBAR       UPDATE
VERTICAL
6100  SEC              POS FOR NEW
6110  SBC #8           LINE
6120  STA VPOSBAR
6130  LDA POS
6140  CMP #$36          TOTAL NU
MBER OF
6150  BCS BD            PICKS ALL
OWED
6160  RTS
6170 BD PLA            LOSE-ALL PICKS
6180  PLA             USED UP
6190  JMP LANE
6200 CLEAR LDA CH      CHECK IF SPACE
6210  CMP #33          BAR PRES
SED
6220  BEQ BE
6230 BF RTS
6240 BE LDA #255
6250  STA CH
6260  LDX POS
6270  LDA NUMPCK        CANNOT
DELETE
6280  BEQ BF          IF NEW LINE
6290  DEC NUMPCK
6300  DEC POS
6310  LDA #0
6320  STA LINE1,X
6330  RTS
6340 JOYST DEC COUNTER CA
N MOVE CURSOR
6350  BEQ BG              ONCE EVE
RY
6360 BH RTS             12/60 SEC
OND
6370 BG LDA #12
6380  STA COUNTER
6390  STA $4D           NO ATTRA
CT MODE
6400  LDA STICK0
6410  CMP #11           LEFT
6420  BEQ BI
6430  CMP #7            RIGHT
6440  BNE BH
6450  INC CSRPOS          0-7 ALLO
WED
6460  LDX CSRPOS
6470  CPX #8
6480  BNE BJ
6490  DEX
6500  LDA #0
6510  STA SC+385,X
6520  LDX #0            MOVE CUR
SOR TO
6530  STX CSRPOS          LEFTMO
ST POS
6540 BK LDA #1
6550  STA SC+385,X
6560  RTS
6570 BJ DEX             CLEAR PRE
VIOUS
6580  LDA #0            CURSOR
POSITION
6590  STA SC+385,X
6600  INX               MOVE CS
R RIGHT
6610  BNE BK            1 POSITION
6620 BI DEC CSRPOS
6630  BPL BL
6640  LDX #0            MOVE CUR
SOR TO
6650  LDA #0             RIGHTMOS
T POS
6660  STA SC+385,X
6670  LDX #7
6680  STX CSRPOS
6690  BNE BK
6700 BL LDX CSRPOS
6710  INX               CLEAR PRE
VIOUS
6720  LDA #0             CURSOR
POSITION
6730  STA SC+385,X
6740  DEX
6750  BPL BK
6760 TIMER LDA RTCLOCK DO NO
THING
6770 BM CMP RTCLOCK    FOR 1
/60
6780  BEQ BM            SECOND
6790  RTS
6800 IM .BYTE $C1,$81,$41,1
6810 ;CHARACTER CODES FOR FA
CE
6820 MXMND .BYTE $2D,$21,$38,$
34,$25,$32,0,$2D,$29,$2E,$24
6830 ;CHAR CODES FOR "MXTR M
ND"
6840 PLIM .BYTE $7C,$FE,$BA,$E
E,$BA,$C6,$7C,0
6850 ;BIT MAP OF FACE
6860 COLOR .BYTE $F,4,$12,$36,$
32,$2A,$C4,$94
6870 ;COLORS AVAILABLE
6880 DL .BYTE $70,$70,$70,$46
6890 ;DISPLAY LIST
6900  .WORD SC
6910  .BYTE 6,6,6,$90,$90,6,$86,$86
6920  .BYTE $86,$86,$86,$86,$86,$
86,$86,$86
6930  .BYTE $86,6,6,$90,$90,6,6,$80
6940  .BYTE 6,$41
6950  .WORD DL
```

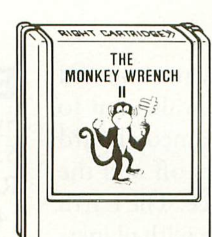
NEW

THE MONKEY WRENCH II

A PROGRAMMERS AID FOR ATARI 800

NEW AND IMPROVED — 18 COMMANDS
PLUGS INTO RIGHT CARTRIDGE SLOT

If you are a person who likes to monkey around with the ATARI 800, then THE MONKEY WRENCH II is for you!! Make your programming tasks easier, less time-consuming and more fun. Why spend extra hours working on a BASIC program when the MONKEY WRENCH can do it for you in seconds. It can also make backup copies of boot type cassette programs. Plugs into the right slot and works with ATARI BASIC cartridge.



$59.95

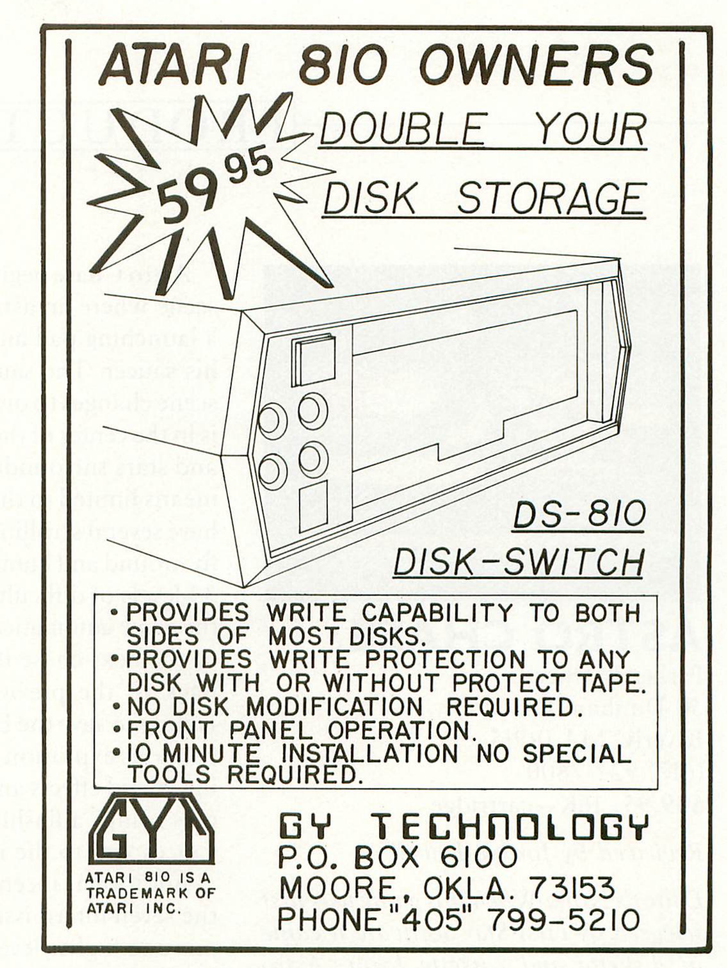
The MONKEY WRENCH provides 18 direct mode commands. They are: AUTO LINE NUMBERING — Provides new line numbers when entering BASIC program lines. RENUMBER — Renumbers BASIC's line numbers including internal references. DELETE LINE NUMBERS — Removes a range BASIC line numbers.

VARIABLES — Display all BASIC variables and their current value. Scrolling — Use the START & SELECT keys to display BASIC lines automatically. Scroll up or down BASIC program. FIND STRING — Find every occurrence of a string, XCHANGE STRING — Find every occurrence of a string and replace it with another string. MOVE LINES — Move lines from one part of program to another part of program. COPY LINES — Copy lines from one part of program to another part of program. FORMATTED LIST — Print BASIC program in special line format and automatic page numbering. DISK DIRECTORY — Display Disk Directory. CHANGE MARGINS — Provides the capability to easily change the screen margins. MEMORY TEST — Provides the capability to test RAM memory. CURSOR EXCHANGE — Allows usage of the cursor keys without holding down the CTRL key. UPPER CASE LOCK — Keeps the computer in the upper case character set. HEX CONVERSION — Converts a hexadecimal number to a decimal number. DECIMAL CONVERSION — Converts a decimal number to a hexadecimal number. MONITOR — Enter the machine language monitor.

In addition to the BASIC commands, the Monkey Wrench also contains a machine language monitor with 16 commands used to interact with the powerful features of the 6502 microprocessor.



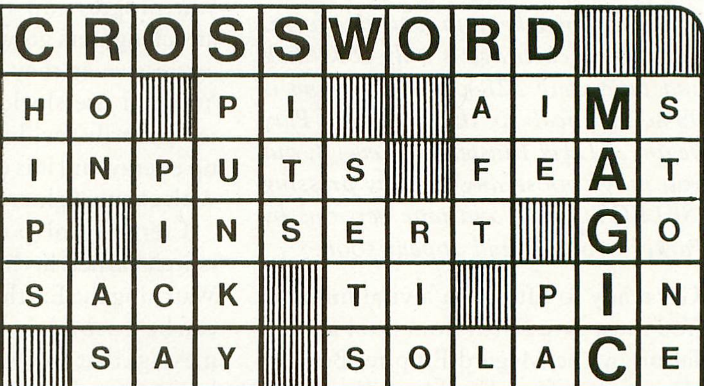
3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446





By LARRY SHERMAN

Two variations of an exciting new game with detailed graphics. Challenge your friends or the computer to see who can win the pot or break the bank.



By LARRY SHERMAN

Supply words using ANY subject and watch CROSSWORD MAGIC interconnect them with lightening speed. Print professional quality puzzles with any one of 24 graphics printers or play them on the screen.

At computer stores or:

L & S COMPUTERWARE
1589 FRASER DRIVE
SUNNYVALE, CA. 94087
(408) 738-3416

ONLY
$29.95
PLEASE SPECIFY
ATARI 400/800, 16K
DISK OR CASSETTE
APPLE II/II+
48K, 3.3 DOS

ONLY
$49.95
PLEASE SPECIFY
ATARI 800, 40K
DISK ONLY
APPLE II/II+
48K, 3.3 DOS

VISA

VISA/MC...$2.00 shipping
Ca. residents add 6% tax



Artwork by Dick Davies...Apple is a trademark of Apple Computer Inc...Atari is a trademark of Atari Inc.



ASTRO CHASE

Parker Brothers
50 Dunham Rd.
Beverly, MA 01915
(617) 927-7600
$39.95, 16K—cartridge

Reviewed by Jordan Powell

Editor's Note: When this game was first released by First Star Software it came in diskette and cassette form. Astro Chase is a registered trademark of First Star but it is now under license to Parker Brothers to market it in cartridge form.

The new cartridge is only 16K (disk and tape were 32K), but the game is 99% identical to the original. Play begins at Level 1 instead of Level 8, but you may choose any level by pressing [SELECT]. Disk and tape versions by Parker Brothers will appear soon.

Get ready to lift off on a vital mission. You must save Earth from total annihilation by the Megard Empire! Because they were defeated and humiliated in a former attempt to conquer us, the Megard's hatred of the Earth knows no bounds. They have surrounded our galaxy with a force field and set Mega Mines converging on Earth. Each mine has the power to completely destroy our planet. Your mission is to vaporize the mines with your lasers before they reach and destroy Earth. Enemy attack fighters are programmed to distract you from your mission and to destroy you if they can. Hot stars and planets add to your difficulties and you must maneuver around them while dodging enemy fighters and destroying Mega mines.

Astro Chase begins with an animated scene where an astronaut walks out to a launching pad and is beamed aboard his saucer. The saucer lifts off and the scene changes to outer space. The Earth is in the center of the screen with planets and stars surrounding it. You are by no means limited to the Earth because you have several scrolling screens in which to fly around and hunt for mines. There are 34 levels of difficulty called chases, and the game automatically moves you ahead to the next chase if you save Earth, or back to the previous one if you fail. Failure to save the Earth results in a stupendous explosion of the planet including sound effects and flying debris. Success brings a flashing message and advances you to the next chase level.

Additional incentives to succeed are the seven intermissions awarded as you move to higher levels of difficulty. During the intermissions you are treated to animated graphics back on Earth. As you progress up the chase levels, the attack fighters grow more powerful and aggressive as they increase in number. You can use shields, which make you temporarily invulnerable, but that eats up energy and it is difficult to reenergize with enemy fighters buzzing all around.

Every reward (points or intermissions) is well earned in this challenging game. Watching the Earth blow up in your face can be frustrating, but when you get the message that "you saved the Earth", it can be immensely satisfying.

A unique feature of Astro Chase is the Single Thrust Propulsion which allows you to move in one direction while firing in another. It takes some getting used to but the advantage is worth the effort. There are more nuances to this game than I could possibly describe here that are well documented in the ten-page booklet you get with the game.

The author of this game, Fernando Herrerra, is well known for his program "My First Alphabet" which won him an Atari Star award. He has done an excellent job on Astro Chase and I highly recommend it.

BLUE MAX

Synapse Software
5221 Central Ave., #200
Richmond, CA 94804
(415) 527-7751
$34.95, 32K—cassette and diskette

Reviewed by Roy D. Wolford

Blue Max is a three-dimensional, diagonally scrolling, World War I dogfight game. The action is fast and furious. The sound effects are excellent, with audible warnings for each key situation. You will be able to fly high- or low-level bombing runs and low-level (25 feet) strafing missions, blasting as many enemy targets as you like while avoiding enemy fire.



You can also set three levels of play with or without gravity. The joystick control can be set to function in a normal or reverse mode. (Note: reverse mode simulates an airplane stick, i.e., forward is down, back is up.) Play can be suspended without penalty by pressing the space bar. It can also be slowed by partially holding down the space bar as you play. With this in mind, get ready to experience the thrill of flying to battle as the famous pilot, Max Chatsworth, otherwise known as the "Blue Max."

"Rule Britannia" is the tune that beckons you into the cockpit of your Sopwith Camel, poised on the runway awaiting the [START] button to be pressed. You can hear the engine rev as your plane taxis down the runway. Warning: don't take off until your ground speed has reached 100 mph, or the mission will end quite abruptly.

continued on page 92

Once in the air, be prepared for the challenge of your life. You must destroy designated enemy targets in a limited amount of time to gain access into the enemy's capital city where three specific targets must be bombed. After successfully bombing the targets, you have to land safely at one of your airfields to complete the mission.

Blue Max is very entertaining and perfectly implemented for use with a joystick and has many nice features.

You will complete two successive levels of play — the river front and the outer city — before arriving at the capital. As you fly, the enemy will attempt to bring you down with fire from planes and anti-aircraft guns located on land and ships. You must maneuver your plane in order to avoid being hit while maintaining an altitude above 21 feet. Flying too low will result in a crash which ends play.

If you get hit, the command console will briefly turn red and indicate, by displaying the letters F, B, M or G, indicating that one of the controls (fuel tank, bomb gear, motor or machine-gun) has been damaged. Once damaged, the machine-gun or bomb gear will only operate intermittently. Maneuverability is diminished when the motor is damaged. Fuel is consumed about twice as fast after the fuel tank is hit. If your plane is hit while all four controls are damaged, it will crash.

As you progress through the mission, fuel is consumed, bombs are used up and damage may be sustained to your controls. You will have to land at one of your airbases to refuel, load bombs and repair damage. A green "R" will display, indicating that you are approaching your airfield. You can clear for landing by pressing the fire button. The "R" will change to a flashing "L" signaling that you can land. Make sure you land quickly in order to allow enough room to take off again.

There are numerous targets that you can destroy which include stationary as well as moving targets. Stationary targets are buildings, tanks, planes, anti-aircraft emplacements, bridges, automobiles and ships. Moving targets are planes, ships, and supply trucks. Targets can be destroyed with machine-gun fire and bombs. The machine-gun is operated by pressing the fire button and descending several feet in altitude.

The number of points awarded for each hit is dependent on several factors, including: whether the target is moving or stationary; whether it is hit by a bomb or machine gun fire; whether it is a designated target; or, in the case of the planes, whether they are shot down flying directly at you or away from you. The points-per-hit range between 10 and 500. Even though you are given a rank that ranges from "Kamikaze trainee" to "the Blue Max", based on the total score, the accumulation of points is not the prime goal of the game.

Blue Max is very entertaining and perfectly implemented for use with a joystick and has many nice features. The control console located at the bottom of the screen gives you all the visual signals necessary to gauge altitude, fuel level, windage, score and plane status. There are frequent audible alarms that alert you to various situations. The plane dives, climbs and banks with ease. Its shadow gives the playfield a nice 3-D effect. Although the graphics are not as detailed as in some Synapse games, they are still superior to many other products on the market.

Beginners and master-gamers alike will enjoy this game. The flow and play of the game at all levels makes it challenging without being frustrating. It gives you a reasonably realistic sensation of flying a biplane. All you need is the wind blowing in your face and this can be simulated with the use of a fan. Viva Blue Max! This game should be around for a long time.

SNOOPER TROOPS–CASE #1

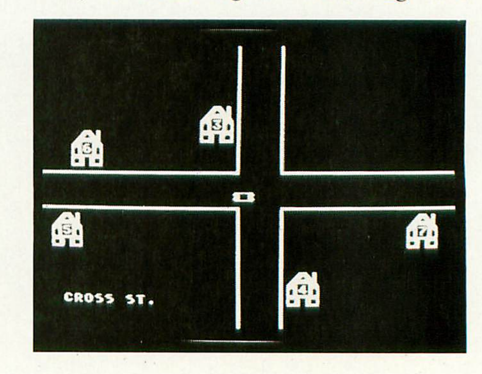
Spinnaker Software
215 First Street
Cambridge, MA 02142
(617) 868-4700
$44.95, 48K — diskette

Reviewed by Valerie Pang

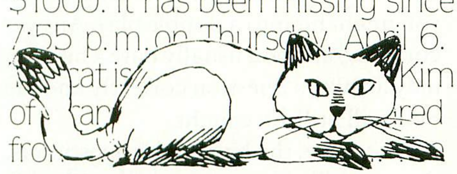
Snooper Troops is an adventure game for children and adults that can educate as well as entertain. Children ages ten and older can begin to develop critical thinking skills by playing detective to solve this mystery. Snooper Troops is a series of cases for the player to solve and in Case #1 — The Granite Point Ghost — as in the subsequent two programs, you are invited to think.

As the detective assigned to Case #1, you are provided a well illustrated notebook which includes background information about the town of Granite Point and data on eight suspects. To crack the case, you must first gather clues and record them carefully. Then you must try to find relationships between the clues, and by synthesizing them arrive at several possible solutions. Your hypotheses must then be proven. In this way a young player utilizes literal facts or concrete clues to formulate analytical judgments.

The Case of the Granite Point Ghost centers on the Kim family who recently moved to an old house called the Cable Mansion. Some of the townspeople believe a ghost lives in the mansion. They've seen lights flickering and



This cat is a champion sealpoint Siamese worth about $1000. It has been missing since 7:55 p.m. on Thursday, April 6.



heard strange noises coming from the house. After the Kims moved in, the lights would flicker, and when the telephone rang, no one was on the line. Then loud clanging noises were heard all over the house and one room was found ransacked.

Why is someone trying to scare the Kim family from the mansion? Is there really a ghost? And how did little Amanda's cat disappear? To find the answers to these perplexing questions, the detective boots up the program and hops into the Snoop Mobile.

The graphics in this mystery-adventure game are great. Additional instructions explaining possible moves the detective could make should be available for the young player, however. The mystery cannot be solved in one or two hours. It may take up to ten or 15 hours to solve the case and this could be frustrating for the junior detective. Also, the program is sometimes slow to respond to commands and this could dampen your enthusiasm for the game.

Beginners and master-gamers alike will enjoy this game. The flow and play of the game at all levels makes it challenging without being frustrating.

As an adventure game, Snooper Troops — Case #1 does not respond as immediately or as creatively as Infocom's Deadline, which I really enjoy. My feelings about this Spinnaker game are mixed. The program is highly innovative and pioneering as an interactive educational tool for children, but I was disappointed in the extremely slow response time. The slow pace coupled with the fact that not enough key clues are provided at the beginning could lead to instant boredom for a player of any age. The graphics are quite clever though, and Snooper Troops does offer a chance to analyze *and* have some fun.

HOCKEY

Gamma Software
P.O. Box 25625
Los Angeles, CA 90025
(213? 473-7441
$29.95, 16K—cassette and diskette

Reviewed by Larry Dziegielewski

If you're a sports fan like myself, then you probably have noticed the lack of good sports games available for the ATARI. There is nothing I enjoy more than sitting down in front of a great game of baseball or hockey, and I couldn't wait until my copy of **Hockey** arrived in the mail.

Hockey by Gamma Software is a two-, three- or four-player game featuring two four-man teams playing on an enclosed rink. Players use joysticks to control the figures on the screen. Nine different game options are allowed, ranging from a two-player game with a three-minute period up to a four-player game with an eight-minute period. An unusual three-player option allows two players to team up against another player. When the game boots up, the default option is a two-player game with a five-minute period.

While game play in Hockey is fun and certainly better than average, I feel the game falls short on realism.

The game starts off with the last few bars of Our National Anthem (I stood up, of course), and the puck is faced off. The players gain control of the puck by simply touching it. Once on offense, the player can move, pass, and shoot the puck. Defense players can also steal the puck, making for an interesting game. A friend and I were able to master control and shooting, but we found it almost impossible to pass the puck off to a fellow player.

Pressing the joystick button allows you to shoot the puck in any direction you wish. When an attempt is made to score on your net, you get control of your goalie, who can only move up and down in the net. The goal can block the shot but not gain possession of the puck. If a pass or shot is missed, the puck will bounce around until someone gets to it. When time has expired, the buzzer sounds and the team with the high score wins. Ties are settled in a tiebreaker period of two minutes.

Game play in Hockey is good, but this game is not without its problems. First of all, there is no "one-player against the computer" feature. This means you always have to have at least one other person around to play this game.

Another thing that bothers me is ATARI's excellent sound capabilities are not fully utilized. From start to finish, you have to listen to the "roar" of the crowd. If you weren't watching the game, this "roar" could be mistaken for a rushing river, or a landslide, or almost anything else. When you score a point, the roar increases, then gently drops back to a mild rush. I preferred to turn the sound off.

Also, there is no pause feature, which would be nice for the longer games, and no handicap feature to pit a better player against a novice.

While the game play in Hockey is fun and certainly better than average, I feel the game falls short on realism. If the flaws in the sound programming were corrected, and certain features that make it appear more like a real hockey game were added, this could have been a great game.

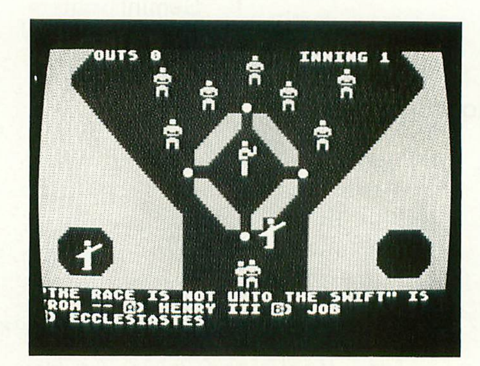
BIBLE BASEBALL

Davka Corporation
845 N. Michigan Ave., Ste. 843
Chicago, IL 60611
(312) 787-7856
$25.00, 32K—diskette

Reviewed by Harvey Bernstein

Software for youngsters that is educational and entertaining has been all too rare. Most "educational" programs released in the past have amounted to little more than math drills incorporated into Space Invader-style shoot-outs. Now, Davka Corporation has attempted something completely different — the merging of baseball and Bible studies. **Bible Baseball** is the game and the result is not quite a home run. A double or triple maybe, but not a home run.

The game can be played by either two players or one player alone against the computer, and the rules are as standard as hot dogs and beer. The difference comes in when you swing at the ball. At your turn at bat you are asked a multiple-choice question out of the Old Testament. When you choose an answer, the pitcher throws the ball. You (the batter) swing and hit it. If your answer is incorrect, one of the outfielders will catch the ball and you are out.



The program will tell you the correct answer, as well as the Bible chapter and verse where the answer can be found, and the question goes back into the file to be asked again. If the question is easy, you might hit into a double play. Answer correctly, and you usually have a hit. You may answer a question correctly and the ball will still be caught.

Of course, the harder the question is, the more likely you are to hit a double or even a home run! The game comes with two files — "major league" and "minor league" — of 100 questions each. Supplementary question disks are expected to be released by Davka later on.

For a game written in BASIC, Bible Baseball has some good graphics and animation routines. The diamond and players in the field are redefined characters, while batting and base-running is accomplished via P/M animation. If one team is way ahead, the pitcher may be taken out and replaced. In addition, there are organ breaks and a 7th inning stretch.

There are some irritating bugs, however. Questions that have been correctly answered once come up again and again. Disabling the [BREAK] key is so easy from BASIC that there is no excuse for not having done so. Also, the program loads very slowly, but Davka promises that this will be corrected in future revisions.

For those that might be interested, Davka has also released Jewish I.Q. Baseball. This is basically the same game, with the questions focusing on aspects of Jewish history, customs, and traditions. This seems to be the earlier product, as it was obviously programmed by someone unfamiliar with the ATARI's capabilities. The graphics and animation are very crude, and Davka says the program is being revised to incorporate the superior graphics and animation of Bible Baseball.

I would categorize Bible Baseball as a good game that, with some minor revisions, could be a much better game for Bible students and baseball fans of all ages.

continued on page 96

CAREER COUNSELOR

MMG Micro Software
P.O. Box 131
Marlboro, NJ 07746
(201) 431-3472
$59.95, 32K—diskette
Requires BASIC cartridge

Reviewed by Roy D. Wolford

Career Counselor, as the title indicates, is a program to help you select the career best suited to your wants and needs. The program is easy to use, has many help screens, and is entirely menu-driven. The manual gives adequate instruction on the use of the program and has some additional tips and references for the selection of a career. There are 337 careers available for review. Two options are provided in this program — the Career Search and the Career Dictionary.

In the Career Search option of the program, you define the elements of the position you are seeking. The program contains 12 major career criteria to assist you in narrowing down the number of careers that may be suitable to your needs. The criteria are interests, aptitudes, educational level, physical demand, environment, variation of tasks, independence, creativity, leadership, career category, earnings range and employment outlook. As you make your choices, the total numbers of careers available to you is narrowed. Depending on the commonality of the element through the range of careers, your choice may narrow the remaining careers very quickly. For example, if you want a career where your earnings will be over $30,000 per year, the number of careers remaining after this selection will drop from 337 to 50 if salary is of prime consideration. The career-category choice will also quickly narrow down the number of careers remaining. Nine career categories, as established by the U.S. Department of Labor, are defined. After you define each element, you can list the careers remaining to the screen or printer. One nice feature of this program is that you can change your selections any time and the program will re-evaluate the available careers.

In the Career Dictionary option, you are given the opportunity to learn more about each career. You select the specific title of a career in order to get a brief one-sentence description of the job function, the D.O.T. (Dept. of Occupational Titles) number, the earnings range and the employment outlook. The Dictionary holds 337 different titles. Each title along with its descriptive information can be listed to the screen or printer.

This program offers an interesting application for the ATARI computerist. The program is fun to use and may yield valuable benefits in the initial phases of a serious career search campaign. However, the program is limited in scope. Many of the careers I wanted to review were not in the dictionary. Also, if you are too selective in your preferences, all 337 careers will be quickly eliminated. Conversely, if you do not give enough preferences for each career criteria, the number of careers will not be narrowed down enough to determine what job is suitable to your tastes. The title-search feature in the Career Dictionary phase is somewhat difficult to use because the career title must be spelled out exactly as it is listed in the table — there are no wild card searches. I also found one bug in the program: the computer locks up when [BREAK] is pressed. In view of the program's limitations and cost, you may want to test the program before buying it so you are satisfied it will provide good value for your money.

The program is fun to use and may yield valuable benefits in the initial phases of a serious career search campaign.

KNOCKOUT

The Avalon Hill Game Co.
4517 Hanford Road
Baltimore, MD 21214
(301) 254-9200
$20.00, 16K—cassette

Reviewed by David Plotkin

Boxing is a sport few of us will ever participate in, and personally, I can't say I mind. Going head to head with some big bruiser till one of us is knocked senseless does not get me real excited. Still, one sometimes wonders what it would be like to climb into the ring, and now, with the help of this game, you can get a taste of this sport.

The first thing to realize is that, even more than with other sports simulations, computer boxing has to leave out a lot. This is basically due to the limitations of using a single joystick. Two joysticks or the keyboard would offer more options, but how many Atarians do you know who are proficient with a keyboard? For example, in Artworx's Golden Gloves, you can duck and weave, but your punches can only be thrown from a single level—no high or low punches are allowed. One cute feature of Golden Gloves is that a knockout does show your opponent (or you!) flat on his back — a nice touch.

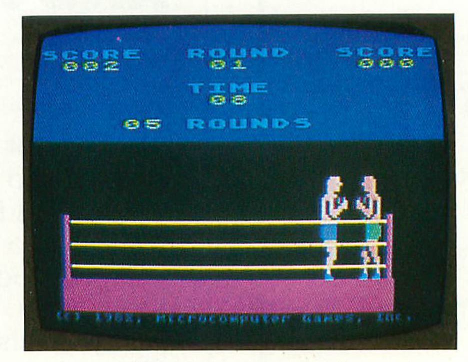
Knockout from Avalon Hill is probably the best implemented boxing arcade game available to date. The two boxers are quite well done in three colors by overlaying two Player/Missile shapes. At the beginning of the match, they come out and bump gloves, return to their corners, and come out slugging. You may play against a human opponent or the computer. Be warned, however, that the computer is a *formidable* opponent. When you play against the computer, you use a joystick plugged into Port 1. A second player plugs a joystick into Port 2 in two-player mode.

In Knockout, you view the ring from the side, and it is strictly two-dimensional. That is, you can't move past your

continued on page 98

opponent to the other side of the ring. Joystick control is quite simple. Left and right motion of the stick makes your boxer move in that direction. Up and down motion raises and lowers the boxer's gloves. Thus, you can block punches by shifting your gloves, and throw punches by pressing the fire button. Rounds are scored by punches landed, and punches to the opponent's head are worth more than body shots. Enough punches landed, especially to the head, results in a TKO (technical knockout), and the game ends.

Although the graphics in Knockout are a little sparse, the overall game is quite enjoyable. Many aspects of real boxing are treated fairly realistically. For example, punches landed from farther away are more telling than punches from up close. You can even "clinch" with your



opponent by moving in very close, where punches are largely ineffective. One good strategy is to clinch, then step back and swing. Your opponent will even be knocked back if you land a good punch.

Unfortunately, it is pretty hard to tell what effect your punches are having. Aside from "knocking back," there are no indications; the head doesn't jerk when you hit it, and the only way to know you've scored a knockout is that it says so in the text window at the bottom of the screen. Your opponent never goes down, but then he also doesn't spurt blood or spit teeth, a fair trade of realism for sensibilities in my opinion.

Knockout is very hard on the joystick hand, even using a quality stick like the WICO. I suspect that a standard Atari stick might not survive prolonged play, but then, neither would your hand. The constant working of the stick and fire button is very wearing, especially since there is a tendency to push the button and stick *hard* in the midst of a bout.

If you would like to try boxing without getting hurt, Avalon Hill's Knockout is just the thing for you. But remember, if you pick your ATARI for your opponent, you may need an icepack for your ego!

MICROGROUP

Edupro
P.O. Box 51346
Palo Alto, CA 94303
(415) 494-2790
$14.95, 16K—cassette
$24.95, 24K—diskette

Reviewed by Julie Sickert

MICROGROUP multi-user educational programs by Edupro take advantage of children's natural inclination for sharing by allowing up to four players at a time. Each game in the series is designed to provide children with an opportunity to compete and cooperate at the same time. Players must work together to achieve the highest possible score for a game.

The Math-Hunt Addition and Subtraction games are a good example of the appeal of this series. The Math-Hunt programs use three different themes, each for particular age group: Storybook Friends is for ages five to nine, American Themes is for ages eight to 13, and the World Around Us is for ages 12 to adult.

Players can choose games with a number of different formats: Fill-in-the-blank, Track or Maze. Joysticks are used to manipulate a lettered cursor around the screen. When the cursor is placed over an empty "bubble" in the number problem to be solved, numbers from 0 to 9 scroll through the cursor's "window." A player selects a number by pressing the firing button on the joystick. If the number is correct, the entire screen will flash briefly, and the score will be incremented.

Each of the formats requires slightly different strategies for play. Fill-in encourages children to work together to complete the problems on the screen. Every player solves his or her own set of problems in Track, but can speed the entire group's progress by helping out others verbally. As players become more comfortable with their joysticks, they can improve their skills by choosing to play longer games with harder problems, or increase their score by the speed with which they move the cursor.

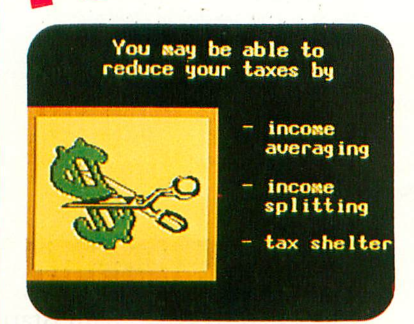
The MICROGROUP programs make good use of the ATARI's graphics, color, and sound capabilities. Joysticks are certainly more fun to use than keys on the keyboard, and a lot easier to control. And the multi-user concept on which the games are based is unique. Children do seem to prefer to work in groups at the computer; they appear to gain more by the interaction that takes place when several children solve a problem together. Often, they will learn by discussion, or observation and imitation of each other. Parents and other members of the family may also choose to take a turn with their children. MICROGROUP games are designed to give everyone a chance to play.

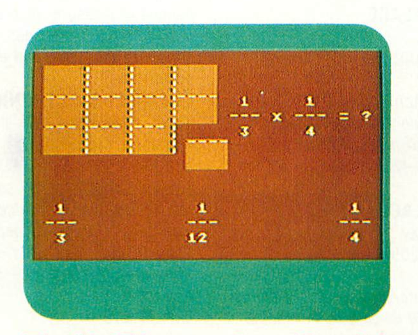
Other programs in the MICROGROUP series from Edupro are Word-Draw, Word-Race, Math-Race, and Team-Word, intended for use by up to eight players with paddles. The Just For Fun programs for all ages include a math and language Sampler, and Picture-Play, which allows children to use ATARI graphics characters and letters to draw pictures on the screen.

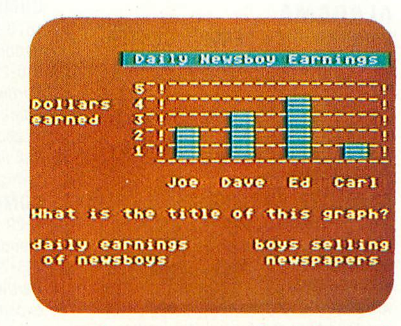
Parents and educators alike will appreciate Edupro's guarantee of satisfaction. Disks have not been protected, so making back-up copies is easy. Extra joysticks, paddles, and extension cables can also be ordered directly.

NEW! For Your Atari Computer

TRS 80 Color, I, III, 4 or Apple Computer







Over 1000 Programs with Full Time Audio Narration, Pictures & Text!

Interactive Tutorial Programs

All along you've heard there isn't much of a selection of low cost microcomputer courseware. Well, do you want to learn Physics, Psychology, or Philosophy? Accounting or Auto Mechanics? Sociology, Supervision or Statistics? Economics or Electronics? How about English as a Second Language? Would you like to teach your children Math or Reading? If you do, then we have the educational programs for you—and at affordable prices.

It's true there aren't many companies that offer full-length courses in subjects other than reading and arithmetic, and what is offered seems to be drills, tests, games, or simulations. What you really want is a course that covers the subject with, say, 16 full-length lessons called tutorial programs, where you interact with an expert programmer backed by a staff of experts. That's exactly what we have.

Is there something wrong with our software? Well, we don't ask you to enter your name so we can drop it into some later text. We don't ask you to type in your answer and refuse to accept it if it's not spelled just right. And, we don't branch around a lot when you make an error. Our programs simply let you know if you're wrong by proceeding only when you select the right multiple-choice answer.

This proven learning-by-positive-reinforcement method lets you proceed quickly and smoothly through the programs, without a lot of cute tricks. But, if you're a devoted computerist or game freak you may be disappointed at the lack of motion in most of the pictures, or our special visual effects. We have some dandies, like the mushroom cloud that rises over Hiroshima in our History series, but your learning is not distracted by needless special effects.

OVER 1000 PROGRAMS

We have 64 courses of 16 half-hour programs: 1024 programs! All are easy-reading, upper- and lower-case. All are in color. All are illustrated by frequent graphics composed of special and regular characters. And, best of all, every frame of every program is accompanied by high-quality, full-time audio narration by professional voice talent. David Stanton, James Mathers, Pam Barrymore. Recorded and played back, not synthesized or digitized!

— If your child is having trouble with Reading or Math, or if he or she is exceptional, and could benefit from professionally programmed lessons or courses, then you need our educational programs for your Atari, Apple, or TRS 80 to help your child.

— If you want to build your math skills, we have programs on Numbers and their meanings, Addition, Subtraction, Multiplication, Division, Fractions, Decimals, Percents, Angles, Graphs, Word Problems, Algebra, Statistics. There are ten series in all, 160 math programs. Again, all with color, pictures, and a friendly tutor's voice—all the time.

— If your verbal skills need polishing, try our Talk & Teach programs on the alphabet, spelling skills, and every level of vocabulary; Sight Words or Learn by Phonics; develop Reading Comprehension skills from stories and articles. There's even a series on the Great Classics.

— For self-development, try a 16-program course in Economics or Psychology. Or Supervision, Sociology, Counseling (Personal, School, or Employee), Writing, Business, Philosophy, Government, World History, U.S. History, or Accounting.

— For vocational skills, study our 16-program courses in Electronics, Fluid Power, Auto Mechanics, Shop, Carpentry, Construction, Meat Processing, Military Skills (64 programs), and there are many more.

There are 832 programs for your Atari, Apple and TRS 80 Mod I/III/4 and 160 for the Color Computer. Send for a free catalog.

Would you like to do something more than play games on your computer? Tired of squeaks and robotics and want to hear a human voice? Do you want to further your education or help your children along in theirs? Now you can. For just **$8.80**, we'll send you one cassette with 2 programs from the course of your choice, 100% guaranteed to work in your Atari, Apple, or TRS 80 computer, and you can try us out. Better yet, get one full course of 16 programs on 8 cassettes for only **$59.90**. Atari Master Cartridge, **$9.95**; Apple T/T Board, **$99.00**; and T/T Player, **$79.00**. That's less than books and tuition for most college classes. And we offer a 10 day, 100% exchange allowance. Does your alma mater? Send us your check, or call us at **1-800-654-3871** with your Visa/Master Card number. We'll send your educational software pre-paid. Please allow 15 days delivery. Or see your computer dealer. He may have some of our courses in stock. You've got nothing to lose but your games!

We're Your Educational Software Source.

Course	No. of Programs
Reading	256
Mathematics	128
Comprehension	48
History	32
Algebra	16
Spelling	16
Government	16

16 Programs in each of the following:
Carpentry-Electronics-Health Services
Office Skills-Statistics-First Aid/Safety
Economics-Business-Accounting-Psychology
And Many More!

For your Atari 400/600/800/1200, you will need the Atari cassette recorder and the Dorsett 4001 Educational Master Cartridge, $9.95. For your Apple II, you will need the Dorsett M402 T/T plug-in board, $99.00, and the M401 stereo cassette player, $79.00. All programs listed are available for TRS 80, I, III, 4, which require the M203 speaker converter, $99.00, and 401 stereo cassette player, $79.00.

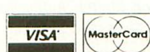
Send for a catalog of over 1000 programs for Atari, TRS 80, Apple, etc.

For more information, write or call: **TOLL FREE 1-800-654-3871**

Dealer inquiries welcome



DORSETT
Educational Systems, Inc.
P.O. Box 1226, Norman, OK 73070



GOTO DIRECTORY

Dealers and wholesale distributors' inquiries welcome. Contact Les Torok, Circulation Manager, 297 Missouri St., S.F., CA (415) 864-0886.

ALABAMA

RAINBOW CITY SERVICE CENTER
244 Rainbow Plaza
Gadsen, AL 35901
205-442-5384
Factory authorized service on ATARI VCS and computers. Parts and accessories.

ARIZONA

COMPUTER WAREHOUSE
2222 E. Indian School Rd.
Phoenix, AZ 85016
800-528-1054
602-954-6109
ATARI 400 & 800 computers and peripherals at the best prices in the country. Call 1-800-528-1054. Ask about our ATARI 800 special system and the ATARI 400 Pac-Man special. We ship nationwide.

CALIFORNIA

ACCESS TO SOFTWARE
4720 Geary Blvd.
San Francisco, CA 94118
415-751-2231
1100 Contra Costa Blvd.
Concord, CA 94520
415-689-1400
An authorized ATARI dealer with the largest selection of Atari software in the Bay Area. Cartridges, tapes, disks, memory cards, joysticks, magazines, games.

THE SOFTWARE STORE
11768 West Pico
Los Angeles, CA 90064
213-473-1136
Software for ATARI computers. APX—third party—ATARI books-magazines.

HW COMPUTERS
19511 Business Center Drive
Northridge, CA 91324
213-886-9200
Full line of personal computers. Atari, TRS-80, Fortune, NEC, California Computer Systems. Complete line of software and hardware. Authorized Servcie Center. Other locations: Westwood, Redondo Beach and Palm Springs.

DIMENSIONAL SOFTWARE
3954 Clairemont Mesa Blvd.
San Diego, CA 92117
714-275-4243
Software/books/peripherals/hardware

3E SOFTWARE AND SYSTEMS
22408 Mission Blvd.
Hayward, CA 94541
415-537-3637
Complete ATARI support center for hardware and software. ATARI, AXLON, OKIDATA, BIT 3, ALIEN, GROUP, BMC, PID, SYNAPSE, ON-LINE, SWIFTY, EPYX GEBELLI, DATASOFT, BRODERBUND, OS, SIRUIS, OSS, EPSON, ARTWORKX, & MORE.

DATA BANKS
3820 Peralta Blvd.
Fremont, CA 94536
415-790-1060
Hardware/software/services/peripherals and a full line of supplies for all ATARI products.

COMPUTERLAND
1815 C Ygnacio Valley Rd.
Walnut Creek, CA 94590
415-935-6502
Wide selection of software for ATARI. Programming seminars, IBM & Altos computers. Books, magazines.

ELECTRONIC FANTASY
2078 Vallco Fashion Park
Cupertino, CA 95014
ATARI computers & large selection of software. Repairs.

COMPUTER PALACE
1670 Market St.
Redding, CA 96001
916-221-1312
Hardware from Apple-ATARI-NEC-Franklin-Commodore. Largest selection of books & magazines in Northern CA. Full line of game-educational-application software.

COMPUTER PLACE
1029 E. Broadway
Glendale, CA 91205
213-241-2551
Hardware/software/peripherals—memory expansion—ATARI voice box. Printers & color monitors—APX—modems—user group. Latest HW/SW—new products—repair all hardware—extension service policy. Mailing list.

COMPUTER STORE INT'L
215 N. Central Ave.
Glendale, CA 91207
213-243-7669
Apple—ATARI—Eagle—Franklin—NEC—largest selection of software, hardware, books and magazines you are ever likely to see under one roof. Call for hard to find items and advice. We have evaluated many, many items and found them unfit for human consumption.

COMPUTER STORE OF SAN LEANDRO
701 Macarthur Blvd.
San Leandro, CA 94577
415-569-4174
Complete ATARI 400/800 systems—business systems from Altos—books, magazines—modems—disk drives—printers—memory chips. Complete selection of games, utility, business, educational software.

SOFTWARE ETC.
106 El Paso Ctr.
San Jose, CA 95130
408-866-4224
Hardware—peripherals—Percom disk drives—books, magazines, games—application—educational—software from Sirius/On-Line/Gebelli/APX/Synapse/Datasoft—computer furniture.

SOUND ROOM
1100 W. Lincoln
Anaheim, CA 92805
714-635-8621
Complete line of ATARI hardware — software—printers—disk drives—joysticks, books, magazines, software, games, utilities, educational.

LEARNING TREE COMPUTER CENTER
2431 N. Tustin Ave.
Santa Ana, CA 92705
714-667-1575
Complete line of ATARI COMPUTERS and software products. Specializing in home, education and business software. AUTHORIZED REPAIR SERVICE CENTER for all Atari and Epson products. Atari Club meets 3rd Thurs. of each month. Write for free catalog.

THE SOFTWARE DEPOT
2652 Towncenter Mall
Sunnyvale, CA 94086
408-730-9494
Microcomputer software, books and accessories for ATARI, Apple, IBM, TRS, VIC and TI computers. Video games for ATARI, Coleco and Mattel. Authorized ATARI computer sales and service

SOFTWAIRE CENTER
47 University Ave.
Palo Alto, CA 94301
415-327-0520
Complete line of software for business, home and pleasure. Also a wide selection of books, magazines, and accessories for the ATARI and all personal computers.

QUEMENT ELECTRONICS
1000 S. Bascom
San Jose, CA 95128
408-998-5900
Largest selection ATARI software, books, magazines, discount prices. Our lines include A.I.—Epyx—Synapse—Don't Ask—Online—Spinnaker—PDI—APX—Mosaic—LJK—Datasoft—Broderbund and more.

G.A.M.E.S
6626 Valjean Ave.
Van Nuys, CA 91406
213-781-1300
Orders call 800-626-6592
10529 Ellis—Fountain Valley
2814 W. Sepulveda—Torrance
3649 T.O. Blvd.—Thousand Oaks
Complete hardware and software for ATARI at super discount prices. We are the first to receive new products & manufacture several of our own accessories. Send $2 to our Van Nuys address for our catalog.

COLORADO

ALPHA CENTER
12351 W. 64th
Arvada, CO 80004
303-421-6361
Open 7 days a week. ATARI—TI—Timex—Commodore—Corvus—NEC—Source—Epson—Prowriter. Authorized repair center.

FLORIDA

ORANGE BLOSSOM HOBBIES
1975 N.W. 36th St.
Miami, FL 33142
305-633-2522
Hardware/software/peripherals

GEORGIA

COMPETITIVE EDGE INC.
Aberdeen Village Ctr.
Peachtree City, GA 30269
404-487-6460
All ATARI products sold below suggested retail. Computer classes in use & programming—youth & adults. Personalized evaluations of individual computer needs. Other personal & business computers available.

ILLINOIS

COMPLETE COMPUTING
890 E. Roosevelt Rd.
Lombard, IL 60148
312-620-0808
Best selection of ATARI software in western suburbs. 10% discount software club. Superb selection of books, magazines. Basic and advanced programming classes. Excellent technical support for ATARI. Loves bad puns.

DIGITALWORLD INC.
711 Army Trail Rd.
Addison, IL 60101
312-628-9222
Complete line of all ATARI products. ATARI service center. Full line of ATARI software & full line of books & magazines. No shipping charges on pre-paid orders or on serviced equipment.

INDIANA

COMPUTERCRAFT
820 S. Rangeline Rd.
Carmel, IN 46032
317-846-5996
We carry a full selection of ATARI hardware & software. Osborne-Epson. Also a wide variety of printers, monitors & supplies. We are an authorized ATARI service center.

KENTUCKY

CHAMCO INC.
2511 Preston Hwy.
Louisville, KY 40217
502-637-3604
Factory authorized service on ATARI video games, and home computers.

MARYLAND

FREDERICK COMPUTER PRODUCTS
5726 Industry Lane
Frederick, MD 21701
301-694-8884
ATARI hardware & great selection of software from many manufacturers. ATARI & other peripherals.

BUSINESS COMPUTER CENTER
8659 Baltimore National Pike
Ellicott City, MD 21043
301-461-2200
BCC carries the complete line of ATARI products along with one of the largest supplies of third party software and hardware available at reasonable prices. Additionally we are a full service dealer.

LOWENS
7227 Wisconsin Ave.
Bethesda, MD 20814
301-652-1289
Hardware—Atari 400/800—VIC—peripherals—Percom disk drives. Full line of ATARI and third party software. Specializing in educational & business software.

MASSACHUSETTS

VIDEO PARADISE SOUTH
28 Samoset St. Rt. 44
Plymouth, MA 02360
617-747-3361
We carry hardware & software, third party software, monitors & accessories. Also ATARI books & magazines. We have training seminars for customers.

CUSTOM ELECTRONICS INC.
238 Exchange
Chicopee, MA 01013
413-592-4761
Hardware, software, peripherals—service for ATARI products. Guaranteed to satisfy your needs. We are "the business which service built". Now in our 22nd year.

THE BIT BUCKET
1294 Washington St.
West Newton, MA 02165
617-964-3080
The widest selection of ATARI hardware and software in New England. Authorized ATARI repair. Books & magazines. Seminars and classes for ATARI. Also carrying Osborne, Altos, and Timex.

THE GAME SHOP
427 Great Rd.
Acton, MA 01720
617-263-0418
10 If you need ATARI stuff then
20 GOTO the Game Shop
30 Poke around
40 Peek hardware, software, printers
50 Peek modems, books, magazines
60 Return (often)

continued on page 102

ALPHARUN *continued from page 69*

```
9120 POSITION 1,9:? #6;"pull joystick
back":POSITION 1,10:? #6;"for NEW GAME
."
9125 IF STICK(0)<>15 THEN 9125
9130 IF STICK(0)=14 THEN 190
9140 IF STICK(0)=13 THEN 140
9150 GOTO 9130
9200 IF LL=9 THEN PTS=PTS+10+TIMEL:LTI
M=LTIM-1:IF LTIM=8 THEN LTIM=9
9210 IF LL=26 THEN PTS=PTS+30+TIMEL:LT
IM=LTIM-5:IF LTIM=30 THEN LTIME=35
9220 GOTO 190
9250 GRAPHICS 18:POSITION 5,2:? #6;"al
pha run":POSITION 9,5:? #6;"by":POSITI
ON 4,8:? #6;"steve groll"
9260 POKE 756,STLL/256
9300 FOR T=1 TO 200:NEXT T:POSITION 0,
2:? #6;CHR$(163):SOUND 2,255,6,2:FOR T
=1 TO 150:NEXT T
9305 SOUND 2,70,6,4
9310 X=0:Y=2:FOR L=1 TO 4:POSITION X,Y
:? #6;" ":X=X+1:POSITION X,Y:? #6;CHR$
(163):FOR T=1 TO 30:NEXT T:NEXT L
9320 FOR L=1 TO 20:READ A,B:POSITION A
,B:? #6;CHR$(92):FOR T=1 TO 7:SOUND 1,
40,8,15:SOUND 2,30,8,15:NEXT T
9330 SOUND 1,0,0,0:SOUND 2,0,0,0:POSIT
ION A,B:? #6;" ":NEXT L:RETURN
9510 DATA 24,90,126,90,24,219,255,219,
224,238,68,255,255,68,238,224,7,119,34
,255,255,34,119,7
9530 DATA 219,255,219,24,90,126,90,24
9540 DATA 60,126,255,255,255,255,126,6
0,146,84,40,149,40,84,146,17,255,255,2
55,255,255,255,255,255
9600 DATA 5,2,6,2,7,2,8,2,9,2,11,2,12,
2,13,2,9,5,10,5,4,8,5,8,6,8,7,8,8,8,11
,8,12,8,13,8,14,8,15,8
10000 DATA 4,3,4,8,7,4,7,6,11,4,11,6,9
,8,9,2,15,3,15,8
```

TYPO TABLE

Variable checksum = 1132545

Line num		range	Code	Length
1	-	140	ML	505
145	-	160	DN	510
165	-	200	YB	558
205	-	510	AR	506
540	-	1014	VX	510
2000	-	5500	RR	555
6000	-	6105	CA	541
6110	-	7400	MY	474
7500	-	9100	TN	509
9105	-	9210	FC	519
9220	-	9320	XV	617
9330	-	10000	BQ	458

TWO TECH TIPS

TECH TIP ONE

Synassembler from Synapse is a popular and well-regarded product. However, the documentation tells you that directives like .BYTE must be converted from the syntax used in other assemblers, but does not specify how. Most assembly language programs printed in ANTIC and other magazines were created with the Atari Assembler Editor cartridge. Here are some, but not all, conversions for ASM/ED to Synassembler directive syntax. If you come up with any others, please send them in and we'll print them.

Assembler Editor	Synassembler
*=	.OR
=	.EQ
.BYTE $A0,$7B,0,0,$4	.HS A07B000004
.BYTE "D:FILENAME"	.AS "D:FILENAME"
.BYTE "C:",$9B	.AS "C:"
	.HS 9B
.BYTE 30,29,28,27,26	.DA #30,#29,#28,#27,#26
.WORD $AA00	.DA $AA00

TECH TIP TWO

"Chips," or LSI circuits, are used to provide memory space in microcomputers. Manufacturing defects in these tiny devices sometimes go unnoticed until the consumer uses them awhile. A bad chip will often cause a bug, otherwise unexplainable. For example, a wrong letter or number will pop up when a program is recalled from memory.

As your ATARI system grows, you will probably expand its RAM by purchasing a new memory board. Several different brands of memory boards are on the market, which, when combined with the RAM now delivered with the ATARI, will give full capacity. (Caution: ATARI 400 is not designed for more than 16K. Expansion beyond that point voids the warranty and is done at your own risk.)

The XL line of computers have full memory installed at purchase, and have a built-in memory test program.

When you buy a new memory board you should have it tested. This only takes a few minutes, and most dealers should be able to run a test for you. One common test program is "RAMSCAN" by Axlon. This disk-based program surveys all RAM addresses for proper functioning. A defective chip will "show" and the memory address of the fault will display, but that need not concern you. Just make sure the board you buy is flawless. After all they aren't cheap!

GOTO DIRECTORY

MICHIGAN

BINARY CORP.
3237 Woodword Ave.
Berkeley, MI 48072
313-548-0533
ATARI hardware & software. FASTCHIP and The Terminal program. ATARI & other peripherals. Books & magazines.

RITEWAY ENTERPRISES
8262 12 Mile Rd.
Warren, MI 48093
313-751-2454
22027 Michigan Ave.
Dearborn, MI 48124
313-562-3178
Hardware/Software/Peripherals/books. Over 2000 ATARI programs in stock. Epson—NEC—C.Itoh—Okidata printers —Percom drives—BMC monitors—Hayes. Everything for the ATARI. Everything discounted everyday.

MINNESOTA

WIZARD'S WORK
County Rd. 18 & 36th Ave. N.
New Hope, MN 55427
612-546-0311
Complete ATARI computer center. Hardware/software/books/magazines. Over 500 software programs stocked. Instructional classes. Repair center.

MISSOURI

INSTANT REPLAY LTD.
14422-24 S. Outer 40 Rd.
Chesterfield, MO 63017
314-576-0544
Software/books/accessories/hardware. St. Louis' complete ATARI computer center. Innovative and exclusive products like Sidewriter—a typewriter keyboard for the 400, joystick repair kits. We mail order all products.

COMPUTER STOP, INC.
3622 Noland Ct., Ste. E
Independence, MO 64054
816-252-1905
ATARI hardware & software. ATARI service center. We handle nothing but ATARI and third party software for ATARI. Accessories—Books—Training. ATARI Users Group.

NEW JERSEY

EARTHRISE COMPUTER CENTER
6 Green Village Rd.
Madison, NJ 07940
201-377-4084
ATARI, NEC, Franklin computers. Complete software selection. Computer classes.

SOFTWARE ASYLUM, INC.
626 Roosevelt Ave.
Carteret, NJ 07008
201-969-1900
Also Old Bridge
201-536-1401
We ARE ATARI! NJ's largest retailer of Atari programs for 400/800 models; over 400 programs available from more than 60 manufacturers. Send for our latest catalog—only $2.00 (refundable as credit with purchase).

CIRCLE VIDEO & ELECTRONIC
Circle Plaza Shopping Center
Eatontown, NJ 07224
201-542-8897
We carry ATARI hardware & software/authorized repair/books & magazines, seminars & classes. Commodore, TI & Franklin.

WAYNE COMPUTER SOFTWARE
1459 Rt. 23
Wayne, NJ 07470
201-628-7318
Across from Packanack Center, by Wayne Manor
Largest selection of software, peripherals, accessories and books you will ever see in one store—at super prices!!! Call for hard-to-find items and advice.

FELICES FOLLIES
66 Broad St.
Red Bank, NJ 07701
201-842-2862
Hardware/software/peripherals for ATARI/Vic20+64/T.I. 99/Timex/Sinclair/books & magazines. Printers all on display and ready for a demonstration. The most complete Micro store in Monmouth County.

VIDEO CONNECTION OF SOMERSET
900 Easton Ave.
Somerset, NJ 08873
201-545-8733
Hardware/Software/Service/Books

BITS, BYTES & PIECES
190 Buckelew Ave.
Jamesburg, NJ 08831
201-521-2432
We demonstrate ATARI, Commodore and TI programming techniques. We specialize in personalized service. We carry a complete line of third party software—magazines—books. We discount up to 20% below retail.

NEW YORK

THE MICRO CENTER
313 Boulevard Mall
Amherst, NY 14226
716-833-0908
Your complete ATARI headquarters. Best selection in Western New York. We carry hardware & software, accessories & peripherals.

LEIGH'S COMPUTER
212 E. 85th St.
New York, NY 10028
212-879-6257
ATARI hardware, software, books. Magazines, programming classes. Apple & Sinclair.

DATASCAN COMPUTER SYSTEM
2306 N. Ocean Ave.
Farmingvale, NY 11738
516-698-6285
Hardware from ATARI—VIC—NEC—IBEX. Complete business systems—books, magazines—peripherals—printers—modem—game—utility—educational software.

SOFTWARE EMPORIUM
151 Mineola/Willis Ave.
Roslyn Heights, NY 11577
516-625-0550
Specializing in the largest selection of software for ATARI in the metropolitan New York area—games, utilities, business, educational books, magazines, and peripherals including a full line of ATARI compatible printers. Lots more of hard to get items.

OHIO

DIGITRENDS
1813 E. 12th St.
Cleveland, OH 44114
216-241-1813
Best selection in Northern Ohio for ATARI hardware, software, books, periodicals, diskettes, computer furniture and accessories. Phone orders and charge cards accepted. Prompt shipment.

ELECTRONIC CONNEXION
424 E. Stroop Rd.
Kettering, OH 45429
513-294-0222
ATARI sales and authorized service. Over 400 programs in stock. Books, magazines, software exchange.

COMPUTER CORNER
5104 Mayfield Rd.
Lyndhurst, OH 44124
216-473-5010
ATARI hardware & software for games & business applications. Basic and advanced programming classes. Authorized service center for ATARI, Commodore, Eagle and Epson.

DATA MANAGEMENT SYSTEM
2979 West Market St.
201 S. Main St.
Akron, OH 44308
216-666-3226
Factory authorized dealer/repairs. Software development marketing.

VIDEO DEPOT
1278 Euclid Ave.
Cleveland, OH 44115
216-696-3588
Second largest selection of software in Cleveland. Over 300 pieces of software, Signalmen modems, Alien Group Voice Box. Full selection of books and magazines.

OKLAHOMA

THE COMPUTER MART
3003 East 51st St.
Tulsa, OK 74105
918-664-8452
ATARI computers & software. Northstar & Victor computers. Books & magazines.

PENNSYLVANIA

RADIO 437 STORE & CO.
924 Chestnut St.
Philadelphia, PA 19107
215-627-8250
333 Montgomery Ave.
Bala Cynwyd, PA 19004
215-664-4374
Largest selection of ATARI software in the Delaware Valley at discount prices. Complete stock of peripherals, hardware & computer furniture. All major credit cards accepted. Mail order—free catalog on request.

MOSTLY COMPUTERS
36 N. George St.
York, PA 17401
717-843-3879
Complete systems from ATARI—VIC—Northstar—books—magazines—disk drives—modems—printers. Full line of business, games, utility, educational software

CITY SOFTWARE CENTER, INC.
2712 Grant Ave.
Philadelphia, PA 19114
215-969-3300
Largest selection of third party software & ATARI software discounted up to 20%. Blank discs/books/magazines/accessories. Advice on comp. info. Call for prices. Will accept mail order/MC & Visa accepted.

UTAH

THE SOFTWARE HUT
470 E. 200 South
Salt Lake City, UT 84111
801-355-0066
Hardware/software/peripherals

QUALITY TECHNOLOGY
741 S. State St.
Salt Lake City, UT 84111
801-521-5040
Hardware, software, service.

VIRGINIA

FUTURE TEK
6230-10 Rolling Rd.
Springfield, VA 22152
703-644-0026
Hewlett Packard, Basis Computer, Audio-Video & projection TV.

THE AUDIBLE IMAGE
768 Hilltop North Shpg. Ctr.
Virginia Beach, VA 23451
804-422-4429
ATARI specialists—A wide selection of hardware, software, joysticks, keyboards, etc. Games, education, programming & business, all for ATARI! Our customers do our advertising for us.

WASHINGTON

PROGRAMS PLUS
16874 Southcenter Pkwy.
Tukwila, WA 98188
206-575-1375
Software, books & peripherals.

ROB ROY COMPUTER
1109 W. Yakima Ave.
509-575-7704
Hardware, software, repair. ATARI & Northstar computers. Business, applications & game software. Authorized ATARI service.

BUTLER'S TV & COMPUTERS
28717 Pacific Hwy. South
Federal Way, WA 98003
206-941-9096
Specialists in ATARI. Warranty service. Hardware—peripherals—magazines—over 200 software titles in stock.

COMPUTERS +
2504 Jefferson Ave.
Tacoma, WA 98402
206-272-2329
ATARI Hardware—400/800 Vic-20/Percom disk drives/C.Itoh printers. Software educational, utility—game, books—magazines.

WISCONSIN

BYTE SHOP OF MILWAUKEE
4840 S. 76th
Greenfield, WI 53221
414-281-7004
Systems from ATARI—Apple—Compupro—complete range of games, business, magazines—service & repairs—disk drives—printers—RAM boards—modems.

MAGIC LANTERN COMPUTERS
406 S. Park
Madison, WI 53715
608-251-9112
We are Wisconsin's ATARI headquarters—over 600 ATARI programs in stock—third party products—also free catalog.

ATARI CLINIC

by STEVE SWITZER

Q. My ATARI 800, which I purchased in December 1982, locks up and displays 0's across the top of the screen with my Star Raiders cartridge. I exchanged the cartridge twice, and also had the local authorized service center check the computer. The cause of the malfunction, however, was not found. This lock-up has occurred only with the Star Raiders cartridge; all my other cartridges work fine. Do you know what might correct this problem?

Brian Honma
Honolulu, Hawaii

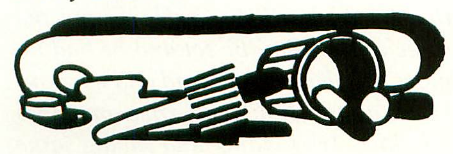
A. *Take your computer back to the servicing dealer and have him run an extensive RAM test on your computer. If the computer does not fail, then have him swap out the ANTIC chip. That should solve your problems.*



Q. I have recently typed in **Chicken** (ANTIC, Vol. 1, No. 1) and I had some troubles with it. After I typed it in, I saved it on my 410. I found some careless typing mistakes. I ran the program and my 400 stopped. I tried the [BREAK] key, [SYSTEM RESET] button, but nothing happened. I could not get any other key to respond.

A. Batek
Non Mills, Canada

A. *Without having your computer to check out, my guess is that you have found the ever-present bug in ATARI BASIC. If your computer does not give you any more problems, I wouldn't worry about it.*



Q. In the June issue of ANTIC I came across a reference to listings of schematics for the ATARI computers and peripherals. Please send quickly. I assume that these contain schematics for the ATARI 800 computer and 810 Disk Drive.

Air-ways Dist.
Centereach, New York

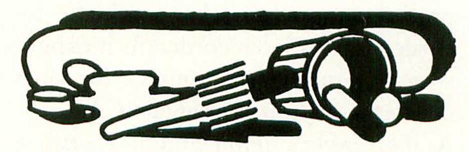
A. *The part number for the Technical User Notes is C016555 and it does not have any information other than for the ATARI 800 and 400. At the present time there are no plans to bring out any technical manuals of any kind for anything other than the 800,400. If you still want the User Notes, then drop us a line at Electronic Fantasy, 52 So. Linden Ave. #1, South San Francisco, CA 94080.*



Q. I don't know where Mr. Switzer gets his information on cleaning disk drives, but it seems he is trying to scare the consumer away from using any of the cleaning disks on the market. He says that they might burn out the head. This is nonsense, as the current heads are made of hard ceramic and it doesn't matter whether you select a wet or dry cleaner. The wet cleaner contains alcohol and acts like a detergent to ease the process. This information comes from a Shugart factory rep.

Steve Dalton
McKeesport, PA

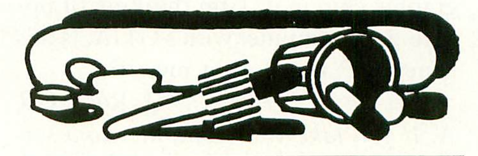
A. *Boy, you guys won't let this die! First of all, some of the information I give is my own opinion, based on experience that I have had in this field. How much experience do you have in repairing drives? I doubt that even a factory rep has very much. I have examined drive heads that were bad and you couldn't see the scratch with the naked eye. The heads are ceramic, but don't fool yourself into believing that they are rugged, or that they can take a beating, because they cannot! I don't know what the issue is; it is so easy and quick to wet clean the head, why take the risk? The cost of replacing the head is just not worth the convenience of using a cleaning disk.*



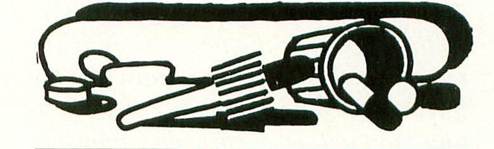
Q. I am the owner of an Atari 1200XL computer with a 1010 recorder. I am looking for more technical data on maintaining it here.

Dalmo Pontual
Salvador, Brazil

A. *I wish that I could help you more, but Atari has dropped the 1200XL from their line and has no plans to produce more. I doubt that they will support the machine with any more publications than are already out.*



Tech Tip: Any time you take the bottom shield off your 400 or 800 computer, remember to put all the screws back and tighten them down all the way. The shield keeps the R.F. interference down and keeps the picture on your T.V. looking clear. —Steve



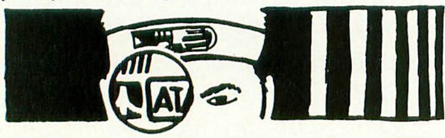
continued on next page

ATARI CLINIC

by STEVE SWITZER

Q. Hooray! We are very glad ANTIC exists. I do local television shows and would like to create titles with my ATARI computer. How do I connect my computer to something that could be recorded by a video recorder? Is it expensive? Where are the sources for such devices? /—**Syron Tomingas, CA**

A. *This is very simple and inexpensive. Just go down to your local Radio Shack store and ask for an R.C.A. to F adaptor part #2780255 at a cost of $3.29. Plug this into the Video IN on your video recorder and plug your computer in the back of the adaptor. This should work fine for what you want to do.*



Q. I have an older 800, with a CTIA graphic chip in it. I am thinking of updating my computer with a GTIA. Is this expensive? Can I do it myself?

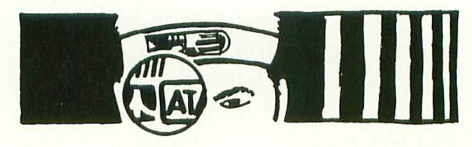
—**J. Ross, OR**

A. *If you take your computer to a service center, it should cost you about $50 to have the GTIA installed. If you do it yourself, then first you must buy the chip (retail cost is about $20). Disassemble your computer as follows: Remove the lid that covers the memory and take out all ROM and RAM cards. Leave the tabs that retain the lid in an open position. Turn your computer over and lay it on its top. Take out the two screws at the rear of the computer, and unscrew the three screws in the front. Lift off the bottom. You will see a speaker; remove it. You will now see a metal plate that is held on with nine screws; unscrew them.*

Be very careful *at this point. To the left of the metal casing you will see a 22-pin connector with pins going from the top board (mother board) to the bottom board (power supply). With your fingers lift up the mother board at the location of this 22-pin connector. As the board starts to rise, leave your left hand on the lower left corner and put your right hand on the upper right corner. Try to keep the board level as it separates from the power supply. After the two boards separate,* stop *and notice the ribbon cable that is attached to the mother board and to the keyboard. Be careful with this connection. Gently pull up on the mother board, leaving the edge that is connected to the keyboard down as you bring the other up.*

Look at the rear of the mother board and you will now see the C.P.U. card. Remember which way the card is facing and gently pull it out of its socket. Place the C.P.U. card so the ships are facing you (fingers down). Notice that all the chips have a dot in one corner; this tells you what direction the chips are to be in the socket. Find the chip with the number C012295 (second from the left). Insert a small screwdriver between the socket and the chip, and pry up gently. The chip should slowly come out of its socket. Take the new GTIA chip, and use the little dot to guide position. Insert the chip in the socket. Look very closely to make sure that no pins are bent or outside the socket. Notice in the upper-right corner of the card a little plastic knob on a 500K pot. This is the color adjustment, don't turn it yet.

Now place the card back in the mother board and reverse all the steps you made while taking the machine apart. Be very careful when putting the mother board and the power supply back together so you don't bend any of the pins on that 22-pin socket. When the plastic bottom is on, turn the machine over and install the RAM and ROM cards again.



Leave the cover off so you can adjust the color. Look at the lower-right corner, where the door closes on the cartridges, and you will see a hole with a darker-colored, plastic piece in the hole. This is the switch that shuts the computer off when you open the door. Put a nail file gently down this hole and you will feel the switch at work.

Power up the computer and see if the color is right. If it isn't, take a small screwdriver and place it in the hole at the back of the metal casing. This is where the 500K pot is. Turn it until you have the right screen color. You may not be able to adjust the color perfectly, but it should do. If you can't get it right, then take your computer to your nearest service center and let them adjust it for you. If you can't find a servicer that will sell you a GTIA chip, drop us a line at Electronic Fantasy, 52 So. Linden Ave., South San Francisco, CA 94080.

Test the new chip with this short program:

```
10 GR.11
20 GOTO 10
RUN
```

You should get a black screen rather than a blue one.



Q. Would placing my 810 drive between my 800 and my 12" television set in the same rack, cause problems with data reliability on the diskettes due to the electrical field produced from the television set? —**Bruce Duckworth, KY**

A. *I have only seen this problem once. We had a customer who kept bringing in his drive and telling us that there was something wrong with it. We put his drive through the most grueling tests and every time it passed. But as soon as the customer would hook up his drive at home it would fail. We finally figured out that it was his T.V. set. He moved the drive away from the set and he had no more problems. Go ahead and use your rack and position your drive any place you like. Try loading and saving some programs that you would feel safe in losing. If you don't have any problems then, you shouldn't have any in the future.*

MICROSCREENS *continued from page 74*

Listing 1

```
10 REM MICROLOADER
20 REM A UTILITY FOR
30 REM USING MICROPAINTER FILES
40 REM BY DAVID MILLIGAN,ESQ. 1/15/83
45 REM ANTIC MAGAZINE
50 GRAPHICS 0:POKE 752,1:CAPS=708:LOWC
=709:INVC=710:INLC=711:BRDR=712:ANTIC=
559
60 TRAP 470
70 POKE INVC,0:POKE LOWC,54:POKE INLC,
134:REM SETUP COLOR REGISTERS
80 DL=PEEK(560)+256*PEEK(561):REM SETU
P FIRST DIPLAY LIST
90 POKE DL+3,71:POKE DL+6,0
100 FOR I=DL+7 TO DL+25:A=PEEK(I)
110 IF A=2 THEN POKE I,6:NEXT I
120 POSITION 4,0:? "MICROPAINTER":REM
TITLE SCREEN
130 POSITION 3,2:? "screen loader":RE
M USE INVERSE LOWERCASE
140 POSITION 9,3:? "BY"
150 POSITION 1,4:? "david milligan,esq
.":REM USE INVERSE LOWERCASE
160 POSITION 2,6:? "AFTER SCREEN HAS "
170 POSITION 2,7:? "LOADED,PRESS ANY "
180 POSITION 2,8:? "KEY TO LOAD THE "
190 POSITION 2,9:? "NEXT SCREEN."
200 POSITION 4,12:? " ENTER FILENAME:"
210 DIM FN$(20),LDR$(32),F$(15)
220 FOR I=1 TO 32:READ A:LDR$(I)=CHR$(
A):NEXT I:REM INSTALL M.L. LOADER
230 POSITION 20,12:INPUT F$
240 FN$="D:":FN$(LEN(FN$)+1)=F$
250 GRAPHICS 10:POKE ANTIC,0:POKE 623,
0:REM SETUP MODE "E" D.L.
260 DL=PEEK(560)+256*PEEK(561)
270 POKE DL+3,78
280 FOR I=DL+6 TO DL+200
290 A=PEEK(I):IF A=15 THEN POKE I,14
300 IF A=79 THEN POKE I,78
310 NEXT I
320 POKE ANTIC,34
330 OPEN #3,4,0,FN$:GOSUB 420:REM LOAD
 SCREEN DATA
340 TRAP 470
350 X=USR(ADR(LDR$))
360 GET #3,J1:GET #3,J2:GET #3,J3:GET
#3,J4
370 POKE BRDR,J1:POKE CAPS,J2:POKE LOW
C,J3:POKE INVC,J4:REM MAKE SURE COLORS
 ARE CORRECT
380 POKE 764,255
390 IF PEEK(764)=255 THEN 390
400 POKE 764,255
410 CLR :RUN
420 NOTE #3,SEC,BYT:SECT=SEC+61:BYTE=5
5:POINT #3,SECT,BYTE:REM GET COLOR DAT
A
440 GET #3,J1:GET #3,J2:GET #3,J3:GET
#3,J4
450 POKE BRDR,J1:POKE CAPS,J2:POKE LOW
C,J3:POKE INVC,J4
460 POINT #3,SEC,BYT:RETURN
470 IF PEEK(195)=164 THEN 460:REM IF F
ILE IS APPENDED,LOAD IT ANYWAY
480 GRAPHICS 0:? "ERROR # ";PEEK(195):
FOR T=0 TO 200:NEXT T:RUN
490 DATA 104,162,48,169,7,157,66
500 DATA 3,165,88,157,68,3,165
510 DATA 89,157,69,3,169,0,157
520 DATA 72,3,169,30,157,73,3
530 DATA 32,86,228,96
```

TYPO TABLE

Variable checksum = 492337

Line num range		Code	Length
10 -	110	GR	474
120 -	220	IM	525
230 -	340	WQ	368
350 -	470	XP	459
480 -	530	CJ	191

Listing 2

```
10 REM ENTER THIS SUBROUTINE
20 REM TO YOUR PROGRAM AND
30 REM CHANGE FN$ ON LINE 30040 TO
40 REM YOUR MICROPAINTER FILENAME
30000 CAPS=708:LOWC=709:INVC=710:INLC=
711:BRDR=712:ANTIC=559
30010 TRAP 30240
30020 DIM FN$(20),LDR$(32)
30030 FOR I=1 TO 32:READ A:LDR$(I)=CHR
$(A):NEXT I:REM INSTALL M.L. LOADER
30040 FN$="D:TEST1"
30050 GRAPHICS 10:POKE ANTIC,0:POKE 62
3,0
30060 DL=PEEK(560)+256*PEEK(561)
30070 POKE DL+3,78
30080 FOR I=DL+6 TO DL+200
30090 A=PEEK(I):IF A=15 THEN POKE I,14
30100 IF A=79 THEN POKE I,78
30110 NEXT I
30120 POKE ANTIC,34
30130 OPEN #3,4,0,FN$:GOSUB 30190
30140 TRAP 30240
30150 X=USR(ADR(LDR$))
30160 GET #3,J1:GET #3,J2:GET #3,J3:GE
T #3,J4
30170 POKE BRDR,J1:POKE CAPS,J2:POKE L
OWC,J3:POKE INVC,J4
30180 RETURN
30190 NOTE #3,SEC,BYT:SECT=SEC+61:BYTE
=55:POINT #3,SECT,BYTE
30210 GET #3,J1:GET #3,J2:GET #3,J3:GE
T #3,J4
30220 POKE BRDR,J1:POKE CAPS,J2:POKE L
OWC,J3:POKE INVC,J4
30230 POINT #3,SEC,BYT:RETURN
30240 IF PEEK(195)=164 THEN 30230
30250 ? "ERROR # ";PEEK(195):FOR T=0 T
O 200:NEXT T:RUN
```

continued on next page

```
31000 DATA 104,162,48,169,7,157,66
31010 DATA 3,165,88,157,68,3,165
31020 DATA 89,157,69,3,169,0,157
31030 DATA 72,3,169,30,157,73,3
31040 DATA 32,86,228,96
```

TYPO TABLE

Variable checksum = 472523

Line num	range	Code	Length
10-	30070	IN	417
30080-	30190	ZC	329
30210-	31040	GN	316

Listing 3

```
10 ; CIO SUBROUTINE FOR MICR
OLOADER
20 ; RELOCATABLE CODE
30  PLA
40 ; OPEN IOCB #3
50  LDX #$30
60 ; SET COMMAND BYTE FOR LO
AD
70  LDA #$07
80  STA $0342,X
90 ; SETUP BUFFER
0100  LDA $58
0110  STA $0344,X
0120  LDA $59
0130  STA $0345,X
0140  LDA #$00
0150  STA $0348,X
0160  LDA #$1E
0170  STA $0349,X
0180 ; JUMP TO CIO VECTOR
0190  JSR $E456
0200 ; RETURN FROM USR
0210  RTS
```

LIST OF VARIABLES USED:

CAPS= Color Register 0 and capitals
LOWC= Color Register 1 and lowercase
INVC= Color Register 2 and inverse capitals
INLC= Color Register 3 and inverse lowercase
BRDR= Color Register 4 and border area
ANTIC= Address of ANTIC chip (turn screen display on & off)
DL= address of Display List
J1= JAR #1 of MICRO-PAINTER colors
J2= JAR #2 of MICRO-PAINTER colors
J3= JAR #3 of MICRO-PAINTER colors
J4= JAR #4 of MICRO-PAINTER colors
SEC= starting sector of file
BYT= starting byte of file
SECT= last sector of file
BYTE= starting byte of color data

COMPUTER QUIZ

by GUY HURT

1. Subroutines:
   (a) *are program segments that may be called from many places of a program*
   (b) *are useful to avoid duplicating programming efforts*
   (c) *can help organize programs into logical blocks of code*
   (d) *all of the above*
   (e) *none of the above*

2. What does the following program logic do?
   T = X:X = Y:Y = T
   (a) *increases the value of two variables*
   (b) *increases the value of three variables*
   (c) *alters the contents of two variables*
   (d) *exchanges the contents of two variables*
   (e) *none of the above*

3. PEEK, the BASIC command on the ATARI, means to:
   (a) *alter the contents of a memory location*
   (b) *look at the contents of a memory location*
   (c) *erase the contents of a memory location*
   (d) *exchange the contents of two memory locations*
   (e) *none of the above*

4. An acoustic coupler is an example of a:
   (a) *direct data service*
   (b) *time-shared terminal*
   (c) *modem*
   (d) *multiplexor*
   (e) *none of the above*

5. The amount of required RAM for Graphics Mode 8 is:
   (a) *5900 bytes*
   (b) *6900 bytes*
   (c) *7900 bytes*
   (d) *8900 bytes*
   (e) *none of these*

6. Memory location 707 contains a number representing a:
   (a) *color*
   (b) *position*
   (c) *status*
   (d) *size*
   (e) *none of these*

7. The screen editor is symbolized by what letter?
   (a) *S* (b) *C* (c) *E* (d) *D* (e) *none of these*

8. The Atari 810 disk drive averages _?_ bits per second data transfer rate.
   (a) *5,000*
   (b) *6,000*
   (c) *7,000*
   (d) *8,000*
   (e) *none of these*

9. The internal code of the last key pressed may be found in memory location:
   (a) *$1FC*
   (b) *$2FC*
   (c) *$3FC*
   (d) *$3CF*
   (e) *none of these*

10. SECONDS may be calculated as:
    (a) *PEEK(19)*256 + PEEK(20)*
    (b) *PEEK(18)*256 + PEEK(19)*
    (c) *(PEEK(19)*256 + PEEK(20))/3600*
    (d) *(PEEK(19)*256 + PEEK(20))/60*
    (e) none of the above

11. Examine the memory diagram below.

FREE RAM
DISPLAY LIST
????????????????????
TEXT WINDOW

The item missing is:
    (a) *TOKENIZED BASIC*
    (b) *SCREEN RAM*
    (c) *STACK*
    (d) *PAGE SIX*
    (e) *none of these*

12. Examine the following program:
    5 GR.2: PLOT 0,0:DRAWTO 0,5:DRAWTO 5,5:
    DRAWTO 5,0:DRAWTO 0,0:END
    The output from this program is:
    (a) *a square*
    (b) *a rectangle*
    (c) *a triangle*
    (d) *a parallelogram*
    (e) *nothing*

13. D. is an abbrevation for:
    (a) *DIM*
    (b) *DOS*
    (c) *DATA*
    (d) *DEG*
    (e) *none of these*

14. The floating point number 7.0E-21 is the same as:
    (a) *. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7*
    (b) *. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7*
    (c) *. 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 7*
    (d) *. 7 × 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0*
    (e) *none of these silly numbers*

15. What is an example of ROM?
    (a) *an assembler routine*
    (b) *a BASIC game program on disk*
    (c) *the CENTIPEDE game cartridge*
    (d) *a user-written BASIC program UTILITY*
    (e) *none of the above*

Answers for Quiz #2: 1. *d* 2. *d* 3. *b* 4. *c* 5. *c* 6. *a* 7. *c* 8. *b* 9. *b* 10. *d* 11. *b* 12. *e* 13. *c* 14. *b* 15. *c*

LISTING CONVENTIONS

Table Information

Our custom font listings represent each ATASCII character as it appears on the video screen. You generate some characters by a single keystroke, for example, the regular alphabet. Others require a combination or sequence of keystrokes. In this table, ESC means *press and release* the escape key before pressing another key. CTRL or SHIFT means *press and hold* the control or shift key while simultaneously pressing the following key.

The Atari logo key (人) "toggles" inverse video for all alphanumeric and punctuation characters. Press the logo key once to turn it on; press again to turn it off. On the 1200XL there is no logo key; inverse video is controlled by a key on the function row. Decimal values are given as reference, and correspond to the CHR$ values often used in BASIC listings.

NORMAL VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	CTRL ,	0
	CTRL A	1
	CTRL B	2
	CTRL C	3
	CTRL D	4
	CTRL E	5
	CTRL F	6
	CTRL G	7
	CTRL H	8
	CTRL I	9
	CTRL J	10
	CTRL K	11
	CTRL L	12
	CTRL M	13
	CTRL N	14
	CTRL O	15
	CTRL P	16
	CTRL Q	17
	CTRL R	18
	CTRL S	19
	CTRL T	20
	CTRL U	21
	CTRL V	22
	CTRL W	23
	CTRL X	24
	CTRL Y	25
	CTRL Z	26
	ESC ESC	27
	ESC CTRL –	28
	ESC CTRL =	29
	ESC CTRL +	30
	ESC CTRL *	31
	CTRL .	96
	CTRL ;	123
|	SHIFT =	124
	ESC SHIFT CLEAR	125
	ESC DELETE	126
	ESC TAB	127

INVERSE VIDEO

FOR THIS	TYPE THIS	DECIMAL VALUE
	人CTRL ,	128
	人CTRL A	129
	人CTRL B	130
	人CTRL C	131
	人CTRL D	132
	人CTRL E	133
	人CTRL F	134
	人CTRL G	135
	人CTRL H	136
	人CTRL I	137
	人CTRL J	138
	人CTRL K	139
	人CTRL L	140
	人CTRL M	141
	人CTRL N	142
	人CTRL O	143
	人CTRL P	144
	人CTRL Q	145
	人CTRL R	146
	人CTRL S	147
	人CTRL T	148
	人CTRL U	149
	人CTRL V	150
	人CTRL W	151
	人CTRL X	152
	人CTRL Y	153
	人CTRL Z	154
	ESC SHIFT DELETE	156
	ESC SHIFT INSERT	157
	ESC CTRL TAB	158
	ESC SHIFT TAB	159
	人CTRL .	224
	人CTRL ;	251
	人SHIFT =	252
	ESC CTRL 2	253
	ESC CTRL DELETE	254
	ESC CTRL INSERT	255

Unbelievable Great Savings!

600XL . . . CALL
800XL . . . CALL
1400XL . . CALL
1450XLD . CALL

Atari Inc.

1010 Recorder	$ 72
1050 Disk Drive	$339
1027 Printer	Call
1025 Printer	$409
830 Modem	$145
850 Interface	$159
Entertainer System	$ 64
482 Educator	$110
483 Programmer	$ 52
Communicator II	$209
Atari Accounting	$169
CX4104 Mailing List	$ 19
CXL 4007 Music Composer	$ 42
Programming 2 & 3	Ea. $ 22
Conversational Languages	$ 42
CX4018 Pilot	$ 55
CX405 Pilot	$ 92
CXL4003 Assembler Editor	$ 42
CXB126 Microsoft Basic II	$ 62
CXL4022 Pac-Man	$ 30
CXL4020 Centipede	$ 30
CXL4006 Super Breakout	$ 26
CXL4008 Space Invaders	$ 26
CXL4009 Computer Chess	$ 26
CXL4011 Star Raiders	$ 30
CXL4012 Missile Command	$ 26
CXL4013 Asteroids	$ 26
The Bookkeeper	$102
Home Filing Manager	$ 65
Atari Speed Reading	$ 54
Home Manager Kit	$ 55
Family Finance	$ 36
Time Wise	$ 23
Galaxian	$ 30
Defender	$ 30
Paint	$ 30
Qix	$ 30
Dig Dug	$ 30
ET Phone Home	$ 34
Atari Writer	$ 65
Donkey Kong	$ 36
Donkey Kong Jr.	$ 38
Atari Logo	$ 72
Mickey in the Great Outdoors/D	$ 34
My First Alphabet/D	$ 25
Peter Pan's Daring Escape	$ 34

Business & Utilities

Visicalc	$169
Computari's Financial Wizard	$ 45
Color Accountant	$ 65
Mail Merge	$ 20
Data Perfect	$ 95
Letter Perfect	$105
Bank Street Writer	$ 45
Text Wizard	$ 55
File Manager 800 +	$ 65
Datasm 652.0	$ 59
Syn Assembler	$ 34
K-Dos	$ 59
Lisp Interpreter	$ 79
Basic Compiler	$ 55
Datalink	$ 27
Atari World	$ 39
Color Print	$ 27
Graphics Generator	$ 17
Micropainter	$ 23
Graphics Master	$ 17
P.M.P. Property Management	$149

Modems

Hayes Smartmodem 300 Baud	$209
Hayes Smarmodem 1200	$499
Signalman Modem II	$ 79
Atari 830 Modem	$155

Educational

Pre-School

Sammy the Sea Serpent	(C) $ 13 (D) $ 19
Pre-School I.Q. Builder	(C) $ 13 (D) $ 24
My First Alphabet (D)	$ 26
Alien Counter/Face Flash (D, C)	$ 26
Humpty Dumpty/Jack & Jill (C)	$ 25
Facemaker (D)	$ 23
Juggles Rainbow (D, C)	$ 22
Juggles House	$ 22
Alphabet Zoo (CT)	$ 20

Music

Music Composer (CT)	$ 42
Jerry White Music Lessons (C)	$ 20
Magic Melody Box	$ 14

Social Studies and Geography

Globemaster (D)	$ 27
States and Capitals (C)	$ 12
European Countries and Capitals (C)	$ 12

Math

Monkey Up A Tree(D,C)	$19
Video Math Flash Cards(D,C)	$13
Algicalc(D,C)	$19
Compumath-Fractions	(C)$23(D)$29
Compumath-Decimals	(C)$23(D)$29
Golf Classic/Compubar (Angles)	(D,C)$26
Cash Register	(C)$13(D)$19
Big Math Attack	(C)$17(D)$22
Computation Concentration	(C) $13 (D) $15

Reading and Language Arts

Wordmaker (D, C)	$ 19
Spelling Genie (D, C)	$ 19
Compuread	(C) $ 17 (D) $ 23
Memory Builder/ Concentration	(C) $ 13 (D) $ 19
Let's Spell (C)	$ 13
Do-It-Yourself Spelling (C)	$ 16
S.A.T. College Board Prep (C)	$ 89
Vocabulary Builder I	(C) $ 13 (D) $ 19
Fishing for Homonyms (C)	$ 13
Hey Diddle Diddle (D)	$ 20
Snooper Troops 1 & 2 (D)	Ea. $ 30
Story Machine (D)	$ 23
Crossword Magic (D)	$ 34
Delta Drawing (CT)	$ 23

Programming Techniques

Pilot (Cons. of Educator)	(C) $ 59 (D) $ 99
Invitation to Prog. #2 (C)	$ 22
Invitation to Prog. #3 (C)	$ 22
Tricky Tutorials — Ed Software	
TT#1 Display Lists (C, D)	$ 17
TT#2 Horiz/Vert. Scrolling (C, D)	$ 17
TT#3 Page Flipping (C, D)	$ 17
TT#4 Basics of Animation (C, D)	$ 17
TT#5 Player Missile Graphics (C, D)	$ 24
TT#6 Sound & Music (C,D)	$ 24
TT#7 Disk Utilities (D)	$ 24
TT#8 Character Graphics	$ 19
TT#9 GTIA	$ 19
TT#10 Sound Effects	$ 19
Page 6	$ 20
The Next Step	$ 27

Stocking Stuffers

WICO "BOSS" Joystick	**$ 15.00**
WICO Redball Joystick	**$ 24.00**
Elephant Disks s/s	**$ 18.00**
Verbatim Disks s/d	**$ 24.00**
Disk Savers (Plastic Sleeves) Multi Colored 1 Doz.	**$ 4.50**
Disk Mailers	**$ 3.50**
Flip 'n File Diskette Holder w/Lock (holds 25)	**$ 18.50**
Flip 'n File Diskette Box (holds 50)	**$ 21.00**
Library Carrying Case (holds 10)	**$ 2.50**

Super Savers

Gorilla Banana Printer	**$ 209.00**
Percom Single Density Drive	**$ 389.00**
Percom Double Density Drive	**$ 515.00**
Amdek Color I Monitor	**$ 299.00**

Call Toll Free

1-800-634-6766

Information & Order Inquiries (702) 369-5523

We accept VISA and MasterCard

Dealers' Inquiries Invited

COMPUTER OUTLET

New Hit List

In Search of the Most Amazing Thing	$ 27
Witness	$ 34
Cosmic Balance II	$ 27
Temple of Apshai	$ 27
Raster Blaster	$ 20
Deadline	$ 34
Richochet	$ 15
Wiz & Princess	$ 22
Ali Baba and the Forty Thieves	$ 22
Canyon Climber	$ 20
Crush, Crumble & Chomp	$ 20
Zork I, II & III	Ea.$ 27
Frogger	$ 23
Choplifter	$ 23
Curse of Ra	$ 15
Ulysses and the Golden Fleece	$ 23
Tigers in the Snow	$ 27
David's Midnight Magic (D)	$ 23
Sky Blazer (D)	$ 22
Serpentine (D)	$ 22
Sea Fox (D)	$ 20
Sands of Egypt (D)	$ 27
Pool 400 (CT)	$ 27
Gorf	(D)$ 27 (CT)$ 30
Wizard of Wor	(D)$ 27 (CT)$ 30
Cyborg (D)	$ 23
Gold Rush (D)	$ 23
Bandits (D)	$ 23
Way Out (D)	$ 27
Fast Eddy (CT)	$ 24
World War (CT)	$ 24
The Cosmic Balance (D)	$ 27
Chess (D)	$ 45
Checker (D)	$ 34
Raptillian (D,C)	$ 23
Submarine Commander (CT)	$ 34
Jumbo Jet Pilot (CT)	$ 34
Soccer (CT)	$ 34
Starcross (D)	$ 27
Zaxxon (D,C)	$ 27
Miner 2049er (CT)	$ 34
Twerps (D)	$ 23
Flip Out (D)	$ 20
The Birth of the Phoenix	$ 16
Protector II	(D)$ 23 (CT)$ 29
Baseball (CT)	$ 34
Preppie II (D,C)	$ 23
Arcade Machine (D)	$ 39
Cap n' Cosmos (D)	$ 29
Spy's Demise (D)	$ 15
Repton (D)	$ 27
Critical Mass (D)	$ 27
Millionaire (D)	$ 55
Poker Sam (D)	$ 17
Jump Man (D)	$ 27
Hellfire Warrior (D,C)	$ 27
Trion (D)	$ 27
Adventure in Time (D)	$ 20
Wavy Navy (D)	$ 23
Final Orbit (CT)	$ 23
Pharoah's Curse (D,CT)	$ 23

Printers

NEC 8023A	$ 439
Epson FX80	$ 599
Epson FX100FT	$ 799
Okidata ML82A	$ 419
Okidata ML83A	$ 649
Okidata ML84P	$ 979
Okidata 92	$ 489
Okidata 93	$ 869
Citoh 8510 Prowriter	$ 365
Mannesmann Tally MT160L	$ 599
Qume Sprint 11 +	$1349
Gemini 10X	$ 299
Gemini 15	$ 479

Monitors

Leading Edge Gorilla Hi-Res 12"	$ 85
Amdek Color I	$ 299
USI Amber	$ 149
NEC Green Screen	$ 169

1095 E. Twain, Las Vegas, Nevada 89109 (702) 796-0296 • Mon. — Fri. 8 A.M. to 6 P.M. — Sat. 9 A.M. to 5 P.M.

ORDERING INFORMATION AND TERMS: *For Fast Delivery send cashier checks, money orders or direct bank wire transfers. Personal and company checks allow 3 weeks to clear. Charges for C.O.D. orders are $3.00 minimum or 1% for orders over $300. School purchase orders welcomed. Prices reflect a cash discount only and are subject to change without notice. Please enclose your phone number with any orders.* ***SHIPPING — Software:*** *$2.50 minimum.* ***SHIPPING — Hardware:*** *(Please call)* ***SHIPPING — Foreign Orders:*** *APO & FPO orders: $10 minimum and 15% of all orders over $100. Nevada residents add 5 3/4% sales tax. All goods are new and include factory warranty. Due to our low prices, all sales are final. All returns must be accompanied by a return authorization number. Call 702-369-5523 to obtain one before returning goods for replacement.*

PUBLIC DOMAIN SOFTWARE

PUBLIC DOMAIN SOFTWARE

ANTIC is pleased to offer a library of Public Domain Software for the ATARI computers currently comprised of 12 disks.These programs are not yet available on cassette. These disks contain unprotected material from the libraries of ATARI users' groups from around the country.

The potential buyer should note that these programs are sold *as is*. Their usefulness may depend on your experience with the computer. They may contain programming quirks that require some modification. However, all perform reasonably well. Contents of the disks may vary slightly from the published description due to unforeseen circumstances, but each disk is filled to reasonable capacity with useful programs of the kind described, and represent an excellent value at $10.00 each, plus $1.50 per order for shipping/handling. Send check or money order (payable to ANTIC Publishing), and disk number(s) to: **Public Domain Software, 600 18th Street, San Francisco, CA 94107.** Allow four weeks for delivery. All orders are sent by First-Class Mail. Please add 6½% sales tax for California residents.

ANTIC GAMES DISK #1

1. Chicken: a great game from ANTIC V.1, No.1
2. Hangman: the traditional word game
3. Creation: a version of Life
4. Reverse: order of string numbers
5. Monopoly: computerized!
6. Lunar lander: select terrain (stick)
7. Zonex: hidden color patterns in grid
8. Clewso: detective adventure, graphics

ANTIC GAMES DISK #2

1. Speed Demon: from ANTIC V.1 No.4
2. Guy' Grid Game
3. Deathstar: from ANTIC V.1, No.2
4. Blackjack: Vegas rules
5. Civil War: a strategic simulation
6. Artillery: firing strategy game
7. Super Wumpus: text adventure

ANTIC GAMES DISK #3

1. Petals
2. Showdown
3. FROG: from ANTIC V.1, No.3
4. Draw: Guy Hurt
5. Plus Zero
6. Collisi, and more

ANTIC GAMES DISK #4

1. Vultures: from Stan Ockers
2. Castle Hexagon: also by Stan Ockers
3. Adventure: The remainder of the disk contains an adventure game program which you can play, or you can use the program to write your own adventure. Instructions included in program.

ANTIC GAMES #5

1. Bats: who else? Stan Ockers, from ANTIC V.1, No.5
2. Steller Defense: from ANTIC V.1, No.6, slightly improved.
3. Yahtzee
4. Mastermind
5. Hamurabi: the classic simulation
6. Slalom: become a master schusser
7. Couch: analyze yourself
8. Aceyducy & more

ANTIC PHOTO GRAPHICS

Digitized Photos

ANTIC UTILITY DISK #1

1. Doc: program allows you to accompany programs with separate documentation on disk
2. Microassembler: allows you to create USR routines-assembler, more
3. Assembler-Editor: BASIC, slow but versatile
4. Num: automatic line numbering utility in BASIC
5. Memtest: runs without BASIC cartridge, to test all memory
6. Color: 128 colors at once
7. Printnop: connect parallel printer from jacks 3 & 4

ANTIC UTILITIES DISK #2

1. Bubble Sort: from ANTIC V.1, No.4
2. Typo: from ANTIC V.1, No.3
3. Home inventory
4. KEY 6: Cipher coding
5. Renumber
6. Compare: listings for differences
7. SUPER: menu
8. Modem
9. RT clock & more

ANTIC UTILITIES DISK #3

1. Disassembler: from ANTIC V.2, No.1
2. Tiny Text: from ANTIC V.1, No.6
3. GTIA text window: from ANTIC V.2, No.1
4. Label: disk label on Epson
5. Set up printer: sets up MX80 for Visicalc
6. Keyboard: tutorial & more

ANTIC GRAPHICS DEMO #1

1. Spider: from ANTIC V.1, No.3
2. Rainbow
3. Horses
4. ATARI logo
5. Oxygen
6. Spiral
7. Pretty
8. Message and more

ANTIC MUSIC DISK #1

Requires Music Composer Cartridge

1. Prelude
2. Joplin
3. In My Life
4. Star Trek
5. Daisy
6. Greensleeves
7. Yellow Submarine, and many more

ANTIC GR. & SO. DEMO #1

1. Graphic
2. Draw
3. Rainbow
4. Tune Rite
5. Etch Sketch
6. Baby Pro Sound and more

ANTIC presents these programs in diskette form for the convenience of the ATARI community, in the belief that all of the programs offered are in the Public Domain and that no proprietary interests or rights to these programs are claimed by anyone. These diskettes are not copyprotected, nor does ANTIC claim rights to the programs themselves. The price of the diskettes is based on the cost of making them available.

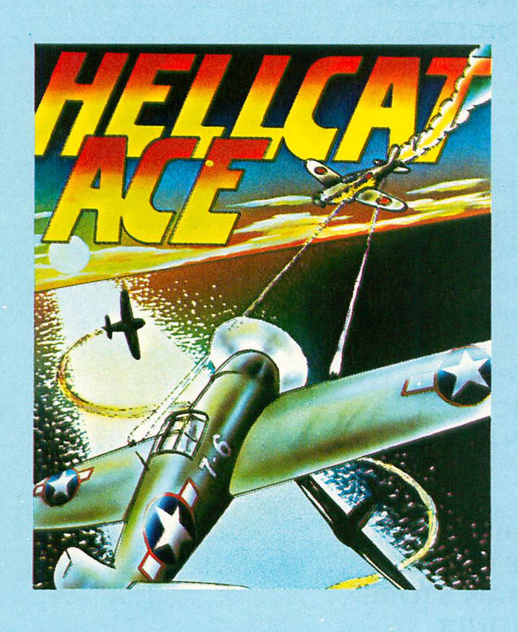
To place orders call toll free: Outside California (800) 227-1617 Ext. 133; Inside California (800) 772-3845 Ext. 133

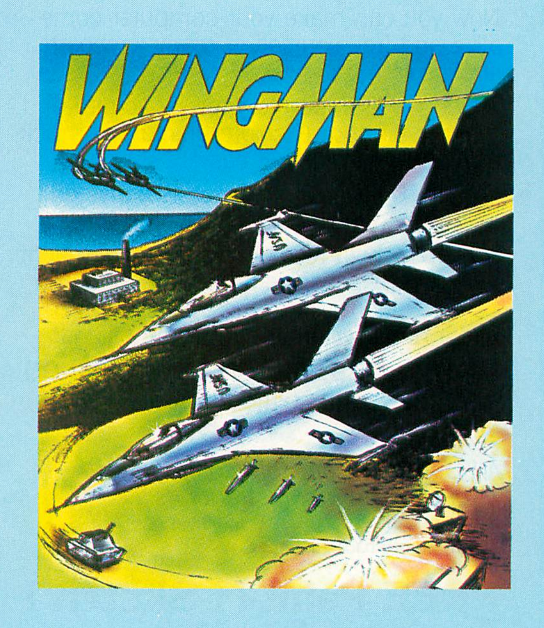
FLYING!

DO YOU HAVE THE RIGHT STUFF??

**TAKEOFFS, LANDINGS, CLIMBS
DIVES, STEEP TURNS, CHANDELLES,
AILERON ROLLS, BARREL ROLLS, LOOPS,
CUBAN 8'S, SPLIT S'S, IMMELMANN TURNS,
AERIAL COMBAT, DEFLECTION SHOTS, STRAFING RUNS,
DIVE BOMBING, AIR-AIR MISSILE LAUNCHES,
FLIGHT LEADERSHIP, FLIGHT TEAMWORK,
HEAD TO HEAD COMBAT . . . . .**

MicroProse Software has the right stuff and we do all these maneuvers in our flight simulations!!! We would like to share our RIGHT STUFF with you. Our over 10,000 hours of flying experience in all types of aircraft from the giant C-5A Galaxy to actual combat in the A-7 fighter allows us to bring you the BEST, MOST REALISTIC, and MOST CHALLENGING flying simulations available for your ATARI or COMMODORE 64 computers! Try your RIGHT STUFF with our fine flying simulations!!!





HELLCAT ACE (Pacific) and **SPITFIRE ACE (Europe)** are 3-D aerial dogfights requiring real fighter pilot skills and maneuvers. (AT/C,...$29.95)...WINGMAN is a player vs. player, head to head, split screen, air to air, and air to ground simulation requiring flight leadership skills to dive, loop, bomb, and strafe enemy territory while defending your own territory. (AT/C,...$34.95)...MIG ALLEY ACE is a split screen, head to head, 3-D aerial dogfight combat simulation of Korean Conflict out the cockpit F-86 flying. (AT,...$34.95) ...SOLO FLIGHT is an outstanding flight trainer that provides realistic takeoffs and landings, cross-country navigation, and uses a three dimensional view of the actual airborne aircraft and the surrounding terrain to provide realistic and challenging training to pilots of all skill levels. (AT,...$34.95)

If you cannot find our software at your local retailer, you can order by MasterCard or Visa, money order, COD, or Check. Add $2.50 for postage and handling. MD residents add 5% sales tax. Call or write:

MicroProse Software **1 Caribou Court, Parkton, MD 21120, (301) 357-4739**

DEALER INQUIRIES WELCOME!

ADVERTISERS LIST

This list is provided as a convenience and as a courtesy to advertisers. ANTIC does not guarantee accuracy or comprehensiveness.



John Anderson's
RALLY SPEEDWAY
SLIP INTO SOMETHING TURBO-CHARGED
like the road-scorching speedster in RALLY SPEEDWAY — the game that turns your ATARI into a full-blown, four-wheeled demon! Take on our demanding course, or use the unique Construct-A-Track option to design your own. Push yourself to the limit for a better lap time, or get a friend in on the action for a one-on-one duel to the finish line — it's your choice!
MAKE TRACKS TO YOUR DEALER TODAY!
ATARI 400/800/1200 CARTRIDGE
053-0171 . . . . $49.95
If your dealer doesn't have Rally Speedway in stock, phone 1-800-323-7172 with your order, or write us at Adventure International, P.O. Box 3435, Longwood, FL 32750 for your FREE catalog.
DEALER ORDERS WELCOME
155
COPYRIGHT 1983
Adventure International
A DIVISION OF SCOTT ADAMS, INC.

THE GREATEST ATARI® GAME OF ALL TIME.

Object: Capture more programs than from any other source.
Score: The best prices for programs win.

Actually, every member of CompuClub is a winner, because no one pays lower prices for Atari® programs than our members.

And no other source offers as many programs, with a descriptive catalog covering every piece of software we offer!

CompuClub has hundreds of Atari® programs: games, education and business. It's an astonishing selection, but just as incredible are our prices and our catalog.

Prices always at least 25% below retail

Fact is, usually our prices on selected programs are even lower than that. And we're always running sales with savings of at least 50% from the list price on some of your favorite programs.

And there are several ways to pay: MasterCard, Visa, or the ever popular check or money order.

Annotated catalog, updated every 45 days

We don't like to knock the competition, even by implication, but there are definite advantages to a CompuClub membership. One of the best of them is our catalog, which not only offers an unbelievable number of programs, but includes a description of each and every one of them.

In fact, the catalog is so big and filled with so much information that we print a separate price list. And we keep adding so many programs that we have to update the catalog nine times a year during the course of your membership.

Think of it! No more wondering what's behind the fancy label, no more shooting in the dark or depending on the word of a clerk who may not be familiar with the program you're interested in.

Exclusivity for Atari® owners

We're not trying to be all things to all people. We are definitely the best thing since the floppy disk for Atari® owners, and only Atari® owners. CompuClub is very exclusive.

Our catalog is thick with hundreds of Atari® programs, and only Atari® programs. No more fumbling your way through thickets of strange symbols and codes for the different computers everybody else's catalogs try to cover.

The rules

The rules are simple. To play the CompuClub "game," you've got to be a member. Anyone can join, as long as they fork over a mere five bucks, and agree to buy three programs during the year of membership. Order and buy your programs at any time during the year, but we're sure with our selection and prices that you'll want to get going right away.

Five dollars buys you a one-year membership, exclusive Atari® program offerings, a fully annotated catalog with 9 updates during the year, a current price list (and any necessary updates), a subscription to our newsletter, and discounted prices at all times, including announcements of our periodic sales, which feature savings of 50% off and more.

You can join by filling out the coupon below, or get an instant membership by calling our toll-free number and giving us your MasterCard or Visa identifying number. We'll forward your registration and sales order materials, your catalog and price list, so you can begin ordering right away.

That's all there is to it.

If you think you play a good game, you've got to join CompuClub. It's easy to play, and it saves you money.

We think it's the best Atari® game going, because with us, everybody wins.

CompuClub
Where Atari owners belong.



YES, **CompuClub,** PO Box 652, Natick MA 01760 **ATTN: Dept. AT**
I want to play the greatest Atari® game of all. Please enroll me in CompuClub for one year, and rush my registration material, catalog and price list to me. I agree to buy any three programs during the course of my year of membership. I have enclosed my payment of $5, or authorization to bill my charge card account.

Please make your check payable to CompuClub
Payment enclosed ☐ check ☐ money order.
Bill my ☐ MasterCard ☐ Visa ID #________

Expires________

Signature________

Name________

Address________

City State Zip

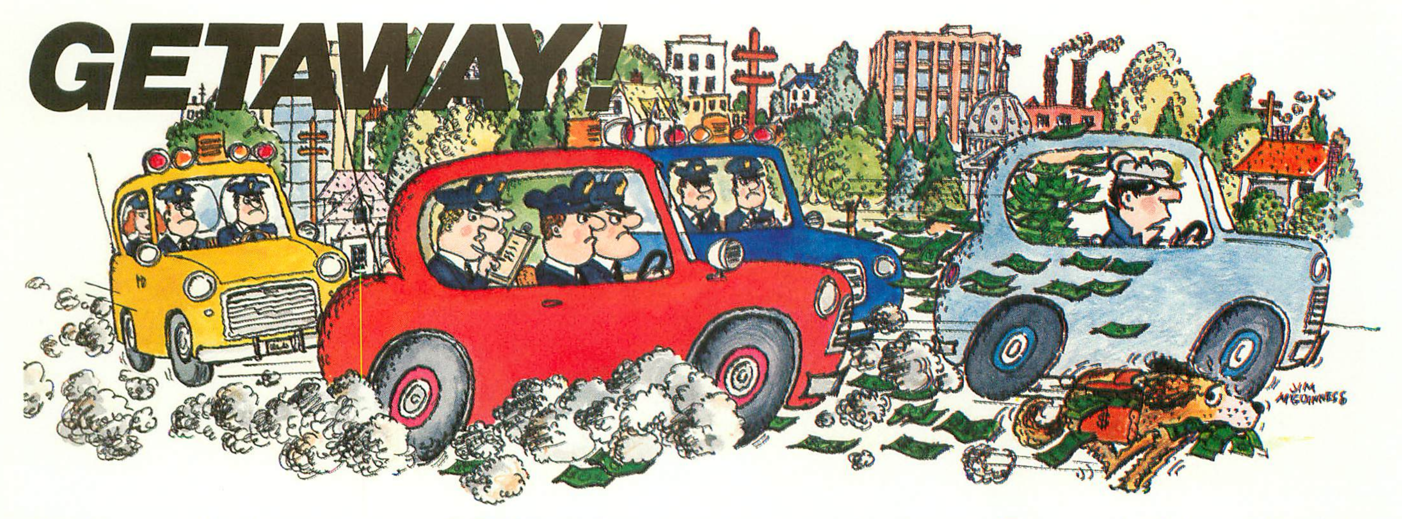
Computer Model________ Disk ☐ Tape ☐

If you are not satisfied in any way with the conditions of your membership, you may cancel before ordering any programs from CompuClub. Your membership fee of $5 will be cheerfully refunded.

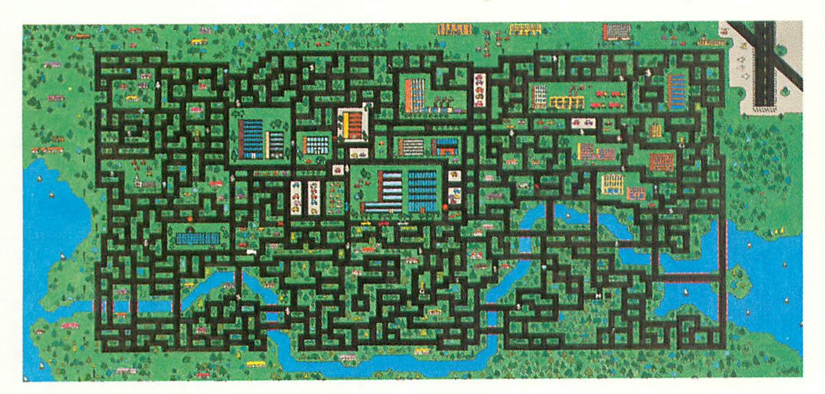
To join by phone, call toll-free.

800-631-3111

Please have your MasterCard or Visa card ready when you call. In Massachusetts, call 1-617-879-5232. We will forward your membership materials after confirming authorization for your charge.



You've got the loot ... now, *GETAWAY!* to a great new game from the Atari® Program Exchange!



It's *all* there! The squall of sirens, the crazy turns down endless city streets, the anxious search for ill-gotten gain, the race against time for a safe place to stash your cash! Now your gas tank is nearly empty and night is about to fall. The coppers are closing in fast. Before you learn again that crime doesn't pay...Quick! ***GETAWAY!***

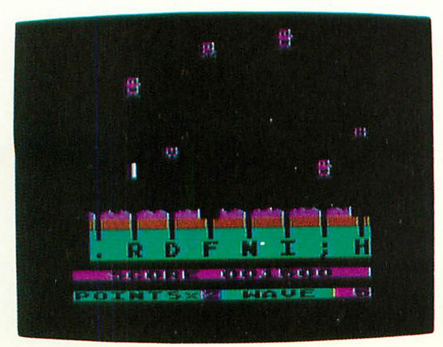
Ask for *GETAWAY!* at your local Atari software retailer, or order direct. Phone 800-538-1862, or 800-672-1850 in California. Or write Atari Program Exchange, P.O. Box 3705, Santa Clara, CA 95055.

Cassette (410)	APX-10195 32K	$29.95
Diskette (810)	APX-20195 32K	$29.95

For direct orders, add $2.50.



You're in for a nasty spell ... unless you stop the Typos!



In the dusky world beneath your keyboard the gruesome Typos dwell ...waiting to attack! Term paper due tomorrow? Got to get that book report typed? Fool! The Typos will devour your letters as you type! That could spell D-O-O-M-E for *you!*

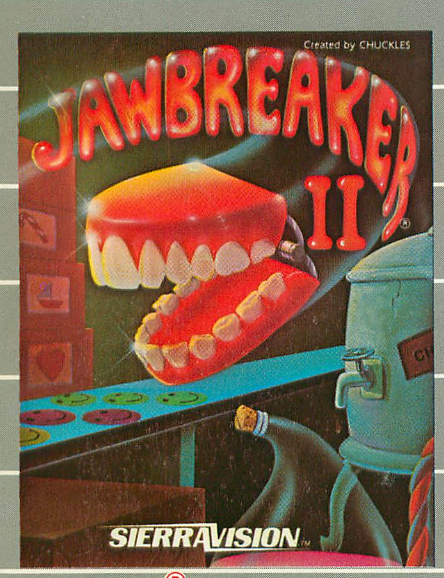
Before you start typing, get down to the real work: destroy the Typos before they destroy your proase... uh, proze...prrrose...Oh NO! THE TYPOS!!! Get ***TYPO ATTACK***, a grand and glorious game from Atari® Program Exchange. It might even improve your typing!

Ask for ***TYPO ATTACK*** at your local Atari software retailer, or order direct. Phone 800-538-1862, or 800-672-1850 in California. Or write Atari Program Exchange, P.O. Box 3705, Santa Clara, CA 95055.

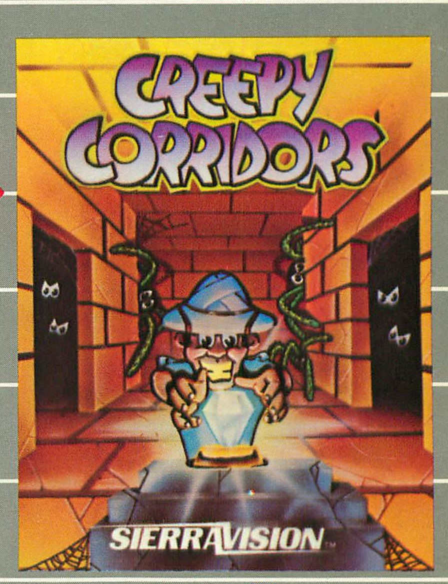
Cassette (410):	APX-10180	8K	$29.95
Diskette (810):	APX-20180	16K	$29.95

For direct orders, add $2.50.

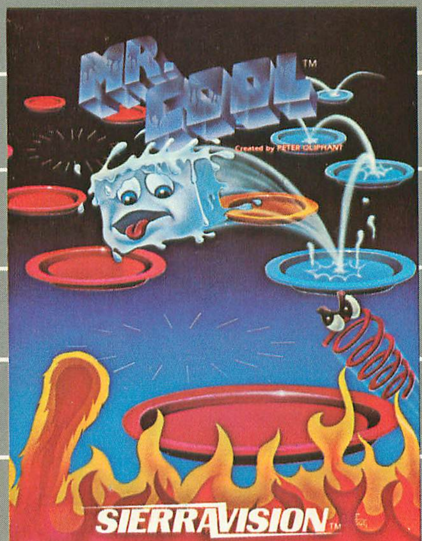
CARTRIDGES FOR ATARI® HOME COMPUTERS



JAWBREAKER® II - Now a new and deliciously different action game to follow the all-time best seller. A challenging new twist on an old favorite.



CREEPY CORRIDORS™ - Crawling critters will be chasing you all over the screen in this addicting action game. An exciting race to gather jewels. . . and save your life.



MR. COOL™ - A furnace of fun. Hop about the pyro-pyramid while avoiding menacing hot springs and shooting fireballs.

Mr. Cool, Creepy Corridors and Jawbreaker II are now available on cartridge for the Atari 400, 600, 800, 1400 and 1450 computers. These and other titles are selectively available for the Apple II, Commodore 64, IBM-PC and Vic-20 from your local software dealer.

